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## ABSTRACT

Papers on library education presented at the 1982 International Federation of Library Associations (IFLA) conference include: (1) "Learning and Library Networks at Mid-Career Level: The Possible Contribution of the Library Schools" by M. H. Heine (United Kingdom); (2) "Network Implications for Library Education: Planning for (the) Future of (the) Changing Library Profession" by Tamiko Matsumura (Japan); (3) "Networks in the Library School Curriculum" by R. F. Guy and J. A. Large (United Kingdom); (4) "Education for the Information Industry and Implications for Library Schools" by G. Edward Evans (United States); (5) "Network of Library Schools in the USSR in (a) Developed Socialist Society: Problems of Coordination, Cooperation and Scientific/Methodological Guidance" by K. I. Abramov (USSR); (6) "Information Provision of Large Research Programmes by the Library Network of the USSR Academy of Science Siberian Branch" by B. S. Elepov and A. N. Lebedeva (USSR); (7) "The Development of Networks in the English-Speaking World and Europe: The Contribution of the British Library Research and Development Department" by Brian J. Perry (United Kingdom); and (8) "Equivalence and Reciprocity of Qualifications: A State-of-the-Art Report" by Josephine Riss Fang (United States) and Paul Nauta (Netherlands), which describes the progress of an IFLA project on determining the availability and comparability of library training in different countries. (ESR)

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réseaux  
48e conférence générale de l'IFLA - Montréal  
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networks  
48th IFLA General Conference - Montréal  
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IFLA GENERAL CONFERENCE, MONTREAL 1982

Division: Education and Research

Section on Library Schools and Other Training Aspects

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Learning and library networks at  
mid-career level: the possible  
contribution of the library schools

by

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Meeting  
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# ABSTRACT

General educational aims for librarianship curricula at first- and second-professional qualification levels, are put forward and contrasted. It is suggested that at the first level the aim is largely the creation of factual knowledge. At the second, perhaps mid-career, level the main aim is to develop analytical skills and an interest in problem-solving. At the latter level, a strongly integrated curriculum is needed, with teaching undertaken in partnership with library practitioners. The place of library networks (both document-delivery networks, and bibliographical-record delivery networks) in such curricula is also suggested. Case-study approaches may be useful at the second level, and an example of one (the founding of the National Lending Library in Britain) is outlined.

## 1. INTRODUCTION

The problems of learning any librarianship topic, such as library/information networks, are not easily separated from more general learning matters. There is first the general problem of whether learning is better done in a library school, or better done outside it - for example by self-tuition or attendance at a professional meeting. Secondly, there is the problem of whether learning 'about' any specific topic has aims peculiar to that topic, or whether learning aims should be defined in general terms with study of a specific topic facilitating the attainment of those aims. (The preposition 'about', in 'learning about X' is a dangerous one, because it assumes that learning should be X-directed rather than directed at using X as a learning vehicle by which to develop general heterarchical skills.<sup>1</sup>) Thirdly, there is the question of whether pre-career learning is different in kind from in-career learning (so-called 'continuing education'.)

The assumptions of this paper, further to the above, are as follows: that pre-career learning in library schools is different in character from in-career learning; that the in-career (and probably mid-career) stage is where learning about, and from, networks is most effective - in the sense of generating the most impact on practice; and that in-career learning aims should preferably be defined in general terms, with the study of library/information networks in particular supporting attainment of these general aims.

The discussion that follows seeks to develop and clarify this viewpoint in two ways: first by contrasting educational aims at the first- and second-professional qualification levels, and secondly by describing how, at the second qualification level, analytical skills can be developed by means of case-study discussions. The case-study discussed is that of the decision to establish a particular document-delivery network in the United Kingdom. In the following, the notation 'DDN' will be used for document delivery network (lending or interlending system), and 'DRDN' for document-record delivery network (e.g. bibliographical data base accessible by computer).

The ideas described here have been partly put into effect in existing first-professional qualification courses at the School of Librarianship and Information Studies, Newcastle upon Tyne Polytechnic. It is intended that an MA-course, second-professional in character and which the School plans to commence in 1983, will incorporate the type of case-study approach to be described.

## 2. LEARNING AIMS AND THEIR ATTAINMENT

It is difficult to state without controversy what the aims or objectives (treated here as synonymous) of a librarianship/information studies curriculum should be in the area of networks. (The problem is a microcosm of the larger problem of what librarianship curricula should be, as treated for example by the conferences organised by the library schools at Aberystwyth, Perth, and Urbana<sup>2-4</sup>. ) This is largely because of the different perspectives on the educational process by the principal interest groups: employers, central and local government, students, tutors, educational-institution management, and validating bodies. Even within one interest group there may be widely-varying views, some employers for example demanding a general and adaptable theoretical education, others demanding good practical skills (whatever the risk of skill-obsolence). Other employers will want a mixture of skills and theory: a skill in on-line searching of a bibliographical data base, for example, coupled with a degree of judgement as to the advantages and disadvantages of using externally-supplied and possibly standardised records in an individual library.

It can be argued that educational aims in the area of DDN and DRDN should be stated differently for learning at the pre-career or early-career stage (i.e. first-professional qualification stage) and in-career or mid-career stage (second-professional qualification stage). At the first stage, the need is essentially for knowledge of a hierarchical type (with the emphasis on concept identification and categorisation, and terminology) offering a full view of librarianship, and with some complementary learning of practical skills both to give confidence and to enhance the student's productivity in a first appointment. At the second stage, the need is one of learning to adapt to changing functions and increasing responsibilities: largely those associated with planning and staff management, and building on to a basic knowledge. Here, judgemental and behavioural skills are required to be enhanced, and the knowledge is more of a heterarchical character. A fuller categorisation of these aims in respect of DDNs and DRDNs is as follows:

### First-professional qualification level

- (1). To convey understanding of the main distributional phenomena associated with the demand for documents and records of documents. Principally the aim is to introduce the concepts of (a) the distribution of

demand, arising in a given library/user context, over document rank (in the case of journals, this distribution can reasonably be modelled using Bradford's relationship); (b) the distribution of demand as a function of age-of-document (for DDNs) or of age-of-document-record (for DRDNs), in a prescribed library/user context; and (c) the distribution of demand, for a prescribed set of documents or records, and a prescribed library/user context, over time.

- (2) To introduce appropriate network concepts and terminology. This should be as far as conventional usage allows this, i.e. it should attempt to portray the consensus as to what concepts are appropriate rather than introduce the novel and possibly ephemeral concepts in current research literature. Obvious examples of concepts to be introduced are those of document delivery system, bibliographical data base accessing system, related centralised and co-operative systems (including note of the joint DDN and DRDN systems which appear to be emerging), lending function and repository function, and basic concepts of demand/need/supply. (In the latter case, given the absence of clear, prescriptive definitions of a scientific character which are generally accepted, the terms can perhaps only be introduced provisionally.)
- (3) To introduce practical knowledge in respect of the use of at least one DRDN, and in the use by libraries of a specific DDN. (Examples of these might be the use of DIALOG or OCLC, and the use of the lending service of the British Library Lending Division, respectively.) In the case of the former, both practical skills, and confidence in their exercise, are also needed to complement the knowledge imparted and as support for some employers' interests. Most students seem to welcome such practical training.

Implicit in the above is the notion that both DDNs and DRDNs need to be studied. It could be argued that they should be studied jointly using a conceptual apparatus that does not at first distinguish between the supply of documents and the supply of document records. But this seems premature at the present time, despite the convergence in professional thinking (influenced by D.J. Urquhart and developed by the thinking within IFLA) between Universal Bibliographical Control and Universal Availability of Publications,<sup>5</sup> towards the more global concept of Universal Availability of Information.



Second-professional qualification level

- (1) To develop skills in formal network modelling. In the case of DDNs, the curriculum would need to analyse the formal modelling studies by Arms, Korfhage et al, Line, and Nance<sup>6-9</sup>. Obviously an integrated curriculum would need to introduce supplementary knowledge appropriate to the means used by these authors for their analyses of networks, e.g. appropriate mathematical knowledge for Arms's account, and set and graph notation for the approaches by Korfhage or Nance. (This is not to suggest that mathematical modelling is superior to verbal categorisation - the former can too easily exclude vital information not readily describable in mathematical language.)
- (2) To develop a disposition towards problem-identification and problem-solving in the DDN/DRDN area. This is an 'attitudinal' aim, related to the first aim above, and seeks to develop the student's will to use analytical approaches, e.g. the wish to characterise network systems abstractly, to categorise systems, to identify hidden assumptions in arguments used to support a policy, and to recognise arbitrariness in cost-apportionment, pricing decisions, and choice of evaluative evidence. In essence the aim is to develop a critical but constructive outlook on DDN and DRDN management. (Although we have used the term 'analytical' here, it seems clear that the level of thinking needs to be such that the limits of 'analysis' as such are appreciated. In deciding on the need for a network, on that network's objectives, on the need for data to support its design, and the form of that data, for example, one is thinking in a paradigmatic way that superintends both 'analysis' as such and value-judgement. The philosophy of such an approach in its general form has been well advanced by Rein.<sup>10</sup>)
- (3) To link learning of DDNs and DRDNs with appropriate contextual study. Effective learning at the mid-career level should, it is suggested, be integrated rather than piecemeal. This is so if (a) learning is to be problem-led, rather than technique-of-analysis led, and (b) the decisions made in respect of network planning are not to be bad ones arising from an unduly narrow viewpoint. In the area of DDNs in particular, learning should be free to explore



such contextual topics as those outlined in the review papers by Evans, and Olson, Shank and Olsen, the monograph on national library planning by Penna, Foskett and Sewell, or the summary and review paper on DDNs for developing countries by Line<sup>11-14</sup>. Such topics could include, for DDNs: the properties, cost and speed of the national postal system, and of copying machinery; political and personality factors influencing network design (e.g. pressures for accountability for local as against national expenditures, censorship in document supply); the dependence of DDN on trained staff, and the nature of this training; the use of a DDN to service specifically governmental needs; the dependence of demand on the DDN on effective bibliographical control, on the resources available through it, on supply time, and on user-pricing level; and the cultural and professional traditions within the country concerned in respect of the long-term planning of library services as such.

It is suggested that the above aims embody the general concern that mid-career learning should be directed at increasing the range of, and upgrading, the management skills of the librarian. Clearly, as with the case of first-professional qualifications, such learning is best done in a formal educational setting. But this seems more essential in the case of the second-professional qualification where a carefully thought out and integrated curriculum is essential, and where the institutionalisation of learning is such as to allow topics to be treated objectively, the individual's established views to be challenged in a detached way, and where commitment to learning can be recognised in a tangible and acceptable way.

In summary, it is suggested that in teaching networks one needs to distinguish between teaching basic knowledge at first-professional qualification level, and teaching management-oriented skills of a planning/judgemental character at second-professional level. We have in fact preferred the term 'learning' to 'teaching' in the above, in acceptance of the notion that, at the second level especially, the library school's role is basically an enabling one: to define and implement an appropriate curriculum, and to do so in close collaboration with the profession's practising members. We have also suggested implicitly, but state here explicitly, that the skills the second level aims to develop are of a general nature. Study of networks as such thus (deliberately) has ambiguous aims. These are to in part to improve network design and management, but also to help build general skills of the highest value to the user-community of each library.

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### 3. A SAMPLE TREATMENT OF A NETWORK AT SECOND-PROFESSIONAL QUALIFICATION LEVEL

As an indication of the kind of approach that could be adopted in treating a specific network topic at mid-career level, we outline the arguments used to support the decision to establish a centralised, national lending library in the U.K. in the 1950s. The library concerned, the National Lending Library for Science and Technology, was formed from stock of the Science Museum Library in London, and later became, with the addition of stock from the National Central Library in London, the British Library Lending Division. It is at Boston Spa, in West Yorkshire, a non-urban area, and is basically closed-access. These facts are perhaps more widely known than the arguments, at least among junior management, although Urquhart's recent monograph should help to remedy this.<sup>15</sup>

Before itemising these arguments, it is noted that treatment of them at second-qualification level should include all of the following:

Interpretative study. This should include the student's analysis of the identification by the decision-maker of (a) the problem to be solved; (b) the possible decision-options; (c) the nature of, and specific form of, the arguments used in support of the decision made; and (d) the nature of, and specific form of, the data used in support of the decision made.

Evaluative study. This should cover the student's evaluation of:

(a) The adequacy of the range of the decision-options, and of the range of arguments used to choose from them. (Possibly, if discussion of the possibility of sub-optimisation is admitted, the evaluation should also include that of problem-delineation. However, the risk is that the discussion will become too broad to handle.)

(b) The validities of the separate arguments used. This should include evaluation of both logical structure (e.g. internal consistency, or dependence on hidden assumptions or criteria), and empirical data (e.g. treatment of sample design and sampling error, and systematic error).

(c) The conclusions drawn (i.e. the decision made), in the light of the professional and political scene, and the data available, at (i) the time the decision was made, and (ii), the present time.

Extensive study. This type of study (which might also be called

constructive, or creative study) attempts to extend the conceptual apparatus, and range of argument used in dealing with the problem, or with a similar problem existing now or (hypothetically) in the future. Again, this should be attempted by the student rather than put forward dogmatically by the tutor.

It is suggested that such study will strongly contribute to the attainment of the objectives described for second-professional education in the previous section. But of course, just because of its case-study orientation, it will need to be incorporated in a more general and integrated curriculum. This should include appropriate contextual study (analysis of social needs for information, taken at the broadest level, and of social responses to them), study of what the planning process is in theoretical terms, and related study of both a data-analytical and behavioural science character.

The role of a library school in respect of treatments such as that described above is a delicate one. It seems appropriate that these should be initiated by library school tutors, supported by senior practising members of the profession. It also seems appropriate that the library school should guide (or at least influence) the nature and structure of the treatment, and to evaluate it as such, and in general act as a supportive third party. It should create a critical, constructive and objective learning environment. But it is suggested that it is improper for it to suggest the conclusions of such a treatment. That would be both peremptory, in view of the complexity of professional problems, and inappropriate to the learning objectives. The aim is not to adjudicate on the past but to develop general skills and attitudes for the future.

Further to the above remarks, the arguments to be described (a) are those that a library school might reasonably expect a student to identify, with some assistance from tutors as required, and (b) as arguments, could be expected to form only part of the student's treatment of the topic. No priority in the arguments is implied, and there is some paraphrasing from the original work by Urquhart and Bunn.<sup>16</sup>

First argument: Of the serials demanded on interloan, most are demanded rarely. ("For perhaps half the current serials in the Science Museum Library, the total use of a title is less than ten times per decade. "). This in effect says that the distribution of serial-uses over serial rank numbers (the Bradford distribution) is strongly concentrated on low rank values. The inference drawn (not

state explicitly) was that rarely-demanded, and presumably rarely-held, serial titles are more effectively supplied from a centralised source. This is so because (a) the expense of maintaining a union catalogue is then avoided, and (b) standards of document delivery can be more easily monitored and maintained.

Second argument: For constant national resources, the immediate availability of items (issues of serials) is less for a regionalised system than for a centralised system. (The argument used assumes a fixed number of copies held, say  $n$ , with  $n$  being given the values 2, 5 and 10 for demonstration.) These copies are assumed to be held in either (a)  $n$  regions, in each of which the rate of demand is  $1/n$ th of the national rate of demand, and there is one copy, or (b) a centralised collection having all copies. The argument uses the following formula for per cent immediate availability:

$$A = \left\{ \sum_{j=1}^n j P(j) + \sum_{j=n+1}^{\infty} n P(j) \right\} 100/d$$

- but does not quote this explicitly. Here,  $A$  stands for immediate availability,  $P(j)$  stands for the probability that there will be  $j$  demands for the item in an arbitrarily-chosen loan period, and  $d$  stands for the mean rate of demand (either in the region, or nationally).

The data quoted by Urquhart and Bunn is obtainable as follows. Denote the mean rate of demand nationally by  $D$ , and specify values for  $D$  and  $n$ . Then for a region reassign the value 1 to  $n$ , and give  $d$  the value  $D/n$ . For the centralised system give  $n$  its original value, and give  $d$  the value specified for  $P$ . In all cases assume that demands are Poisson, i.e. that the values of  $P(j)$  are given by the expression:

$$\frac{e^{-d} d^j}{j!}$$

where 'e' is the base of natural logarithms, and 'j!' denotes the product:  $j(j-1)(j-2)\dots 1$ . ( $j$  takes on values 0, 1, 2, 3, ...)

Urquhart and Bunn provided data showing that  $A$  for the regionalised system was less than for the centralised system, for Poisson demands and for the values of  $n$  mentioned. With hindsight,



it is perhaps a pity that they did not provide general inequalities for all demand distributions and a general value of  $n$ , but the point was clearly made.

The argument can be stated slightly differently, namely that for a constant value of immediate availability (say  $A = 95\%$ ) a regionalised system will require more copies than a centralised system.

In summary, this argument was that a centralised system is either more economical, for constant immediate availability, or more effective, for constant serial resources, when one construes 'effectiveness' as immediate availability.

Third argument: Use falls off with increasing document age. Urquhart and Bunn claimed that the evidence showed that the rate of demand for individual items (e.g. the parts of a serial) falls off with time, at least on average for scientific serials. They cited data of C.E. Brown in support of this, and also offered data based on a survey of demand for Science Museum Library serials. The latter evidence is of inappropriate character however, as it relates to demand for different works at a fixed time (the year 1956 in fact), i.e. it is synchronous not diachronous in character. Their conjecture appears reasonable however, at least when the user population of a library is reasonably fixed in size, and at least when the demand is for scientific works in view of the evolutionary character of scientific knowledge. The possibility that the assumption may not be valid for demand for works in the social sciences and humanities was noted by Urquhart and Bunn, but the jump from a diachronous to a synchronous viewpoint was not justified by them.

The argument is that the phenomenon makes centralised retention of a serial more economical than regional retention, since discarding in the regions, or relegation to the centralised collection from the regions, reduces the overall resources required for storage. (This is assuming that the centralised collection discards all copies other than one.) The distinction between arguing for a centralised collection replacing regional ones, and a centralised collection having a dynamic relationship with them (or with individual libraries), was not explicit in Urquhart and Bunn's account, and to some extent it is offered with hindsight. The thinking of the 1970s was, as a result primarily of World recession, much directed at 'self-renewal' of libraries, i.e. at

the need for systematic relegation of stock to maintain a library of roughly constant size. As a result the distinction between, and relationship between, national lending and retention functions are more visible to us now.

Fourth argument: Document delivery time, by letter post, is of the order of one day for all parts of the U.K., for a centralised collection, and this is comparable to the speed of delivery from regional collections to their regions. This argument was based on factual data appropriate to the time and does not require further comment.

The above four arguments appear to be the main rational arguments used to justify the founding of the National Lending Library. (More contextual and historical discussion has recently been offered by Urquhart<sup>17</sup>.) In a library school setting, and for students at around mid-career level, one might expect student-led discussion that includes the following points, as well as identification and clarification by students of the arguments themselves:

- (A) The values of  $A$  in argument '2' are appropriate only when the service is a lending service, not a copying-and-distributional service. If each region, and the centralised collection, copied all documents demanded then the value of  $A$  would always be 100%. But  $\geq A$  value of 100% could be achieved with just one copy in a centralised system, strengthening the case for centralisation. (Political forces, at least in those countries that publish extensively, may however act so as to reduce copying, and so restore the concept of a national lending library rather than national copying library. But a national offprints library could overcome this and restore  $A$  to a value close to 100%, if at some higher cost, thinking of the offprints service of the American Mathematical Society as a possible precedent.)
- (B) The measures of lending effectiveness of chosen concern are (a) immediate availability (argument '2'), and (b) delivery time (argument '4'). Cost, a third basic measure of DDN performance (asserted by both Arms and Line<sup>6,8</sup>) is mentioned implicitly in argument '2'. But diseconomies of scale, which has received some attention in the literature, was ignored - although one doubts whether the effect is serious (if it exists at all) in the case of the British Library Lending Division, or even that it is relevant in view of the massive expenditures on staffing in some non-lending

national libraries, expenditure which can be more supportive of scholarship than bibliographical control or document delivery.

A more worrying omission perhaps is the disregard of relevance and non-relevance in the documents supplied. If a regionalised, possibly non-lending system can allow open-access to materials held, the user - assuming he or she is disposed to visit the regional library - may be able to suppress a large number of demands that would otherwise be made on the centralised system, some of which (perhaps 10%?) would on receipt be judged to be not relevant. The study of fallibility in information retrieval, for example retrieval through DRDNs is, in the 1980s, an established science, though it was not so in the 1950s. The concepts in it can now usefully be transported into the study of fallibility in document supply through DDNs. A useful device for decision-making in the area could be the re-expression of unit costs in DDNs so that they pertained to relevant documents supplied by the network rather than all documents supplied by it.

- (C) The assumption of Poisson arrivals of requests, in argument '2', has support from elsewhere in the literature, but its relevance is only to the problem of obtaining orders of magnitude of the difference in  $A$  for regional and centralised systems. One might note that the demands for individual volumes (of a serial or otherwise) will, if Poisson, produce a net demand that is Poisson, although the converse is not necessarily true. A potential objection to individual Poisson demand distributions is that it is more plausible that the perceived need (i.e. 'want') for a document is Poisson than it is that the demand for the document is Poisson. But if it is assumed that the probability of an arbitrarily-chosen want leading to a demand is constant, and wants are Poisson, then it can be proved that one implies the other and the potential objection vanishes. An objection that does not vanish however is that there are assumptions behind the use of the formula for immediate availability which were not stated by Urquhart and Bunn. To the assumptions that they did state should be added the following: it is assumed that no items are returned before the end of the loan period, and it is assumed that loan periods are not overlapping.



(D) A broader, technology-oriented criticism which might be offered of the present standing of the arguments is suggested by the electronic developments of the 1980s. This is that the possibility of dividing a nationally-available lending collection into a set of nationally-available regional collections could now usefully be reconsidered. Existing bibliographical networks such as OCLC (international), SWALCAP (Britain), or CLANN (New South Wales) are devices for facilitating interlending, as well as cooperative cataloguing and acquisition. If such systems could interact with the issue systems of individual libraries in the network, then national holdings could be regionalised with no decrease in national immediate availability levels, and perhaps only a minor change in average postal times. (One notes again that immediate availability is semi-irrelevant as a criterion if copyright laws favour extensive copying by libraries.) The argument for such a system would be that the regional collections could usefully be open-access, since user-collection distances would be smaller. This would facilitate both the creation of global demand (by direct inspection of documents by the user) and a reduction of demands for non-relevant documents (by the same.) Demands for items which were supplied from the regional collection would be issued to users in the region without postal costs, possibly balancing the cost of having the collections open-access. Most of the regional demand would be met regionally (by "Urquhart's law"). The network(s), if comprehensive, would supply the rest. If the residue of demand from a given region was small, and was indeed for rarely-demanded documents, the need for the network(s) to access individual issue systems, mentioned above, would be a dispensable luxury. Possibly the thinking here was that behind the recommendation of the Dainton Committee<sup>18</sup> that regional reference facilities should be provided in the U.K., though without their foreknowledge that electronic technology, and in particular electronic network developments, would proceed as they have done.

The difficulties in identifying and obtaining the data needed to support a decision as between such a system and a centralised system, and undertaking appropriate contextual and operations research studies, are formidable, but should perhaps be faced if it is to be proved that the existing system is the optimal one.<sup>19</sup>

#### 4. CONCLUSIONS

The points given in 3. above are intended to indicate, by way of example,



the kinds of point, and the types of discussion, that a library school should encourage students to offer, at the second-professional qualification level. They do not exhaust the points that should be made in full seminar treatments of DDNs, and in particular do not adequately explore either (a) costing and bibliographical-control aspects of the problem, or (b) operation-specific or nation-specific points, such as those covered in various issues of Interlending Review,<sup>20</sup> those appropriate to demand from higher education and research contexts in Design for Diversity,<sup>21</sup> and those in numerous academic journal papers and annual reports of individual libraries/systems. The linkages in function between document delivery, and co-operative buying, borrowing and cataloguing, have not been developed. But comprehensiveness in discussion is only one educational aim, and one secondary to that of building up general judgemental skill and analytic/synthetic attitudes. (Such comprehensiveness is in any case unattainable, and if it were it would obsolesce.) Analysis of a case study, such as the JDN created with the founding of the National Lending Library in the U.K., should be applicable in part to other library problems: those of planning multi-site academic libraries, or of planning public library services in an urban area. The development of an interest by the student in effectively identifying and characterising such problems, and of a skill in solving them, are surely the main educational aims.

This paper has, in the context of education involving library networks, attempted to support the ideas that second-level qualifications in librarianship are important, and have different aims from primary-level qualifications. We have, in brief, suggested that at the second level, the development of planning skills and attitudes are the main aims. Within 'planning', problem-identification and problem-solving (i.e. decision-making) appear to be the main sub-skills. The key problems in curriculum design at the second level are then two in number. First, following Muisi,<sup>22</sup> how can the curriculum be designed so that it is both adaptable to new concepts and "reflects the essential individuality of the country"? (One problem here is that of how best to introduce comparative study, while orientating the curriculum to national needs.) Secondly, if one requires that the curriculum is to be integrated rather than modular (to offer coherency in both the learning experience and assessment procedure, and to recognise the responsibility on the planner to be comprehensive), then what is its optimum structure?

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NETWORK IMPLICATIONS FOR LIBRARY EDUCATION

Planning for Future of Changing Library Profession

by

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## NETWORK IMPLICATIONS FOR LIBRARY EDUCATION

-- Planning for Future of Changing Library Profession --

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As the social and technological changes acceralate, it becomes increasingly important for library profession to look ahead and to develop plans in anticipation of future changes. It is vital for the profession to survive and to play a leading role in society and not to be overwhelmed by such socio-technological changes. The present paper attempts to point out certain anticipated changes, their possible effects on library profession, and to identify issues of concern for future professional education.

### 1. "Network" Definition

Although a formal dictionary definition of "network" implies a physical connection between the component parts, the word "network" has been used to describe such a broad range of activities as to present some confusion and imprecision. In fact the term has been used to mean any type of cooperative activity between libraries, informal as well as formal consortia, library and information retrieval systems, national and local online systems, systems which link libraries and information centres through telecommunication with computer-controlled data base access and message switching, and organizations that provide such systems and services.

One of the reasonably general working definition was given by Greenberger et al<sup>1)</sup>, who describe networks as those resource-sharing activities that employ computer and

communication techniques, and to arrangements among several separate and independent institutions. And one might add to this definition computer and telecommunication links of individual persons.

For the present paper I interpreted the term "network" to mean the one with characteristics which were just described in the preceeding paragraph. Since other types of network including traditional library cooperation have had significant effects on library profession, a network with computer and telecommunication facilities brings about even more crucial changes because of its inherently different capabilities. It may be argued that the development of such network is feasible only in certain countries at present or in foreseeable future and, therefore, its implications are rather limited. However it is increasingly important for library profession to look ahead and develop plans in anticipation of future changes in order to be able to cope with such changes. It is by no means too early to study possible implications of the kind of network to develop and identify the issues of concern to the profession and its educational system.

## 2. Changing Environment

The environment in which the library exists has been rapidly changing in recent years. The dimensions of change are multiple: one being the tremendous changes in the technological landscape of information and communication. It appears to have reached the stage "where the new technology has

permeated the institution or society, ... to the extent that new undreamed-of uses for the technology can be effectively tried."<sup>2)</sup> Particularly significant is the recent development of a new alternative for conducting communication among groups or networks of persons or organizations such as meetings, study groups, and teaching-learning exchanges. It has often been called 'computerized conferencing' or 'teleconferencing', using computers and computer terminals to provide a written form of discussion or meeting among a group of people. With the wide-spread availability of human communication via computer, it is foreseeable that "national and international electronic communication networks would ultimately become a basic form of social organization in postindustrial society."<sup>3)</sup>

In describing the concept of "network nation", Hiltz and Turoff anticipate among others the following developments which will be implemented by 1990:<sup>4)</sup>

- \* implementation of new technologies, such as satellite communication and portable telephones, which will connect the entire world into one telecommunications-linked network, making a computer-based information and communications system accessible at low cost from any location;
- \* replacement of the current systems for the storage and retrieval of knowledge (consisting of periodicals, books, libraries, separate data bases, and abstract services on various computers, etc.) with an integrated, online system of abstract and bibliographic services, text, and data bases;

- \* replacement of printed newspapers by constantly updated online news and classified advertising services;
- \* computer-assisted instruction routines incorporating discussion or conferencing capabilities between student and teacher, or among the members of a class, facilitating life-long learning from the home;
- \* computer-based office automation systems that facilitate work at home or at decentralized neighbourhood centres;
- \* inexpensive, high-quality home terminals and personal computers;
- \* electronic funds transfer and shop-at-home services making it possible to search for, order, and pay for most goods and services from the home terminal;
- \* emergence and sustenance of family, friendship, professional, and leisure-oriented networks through computerized conference.

### 3. New Concept of Library Profession

Such dramatic changes in socio-technological dimensions will necessarily affect the library and information services and the library profession. Services expand and change as a result of new technologies, which at the same time, allow better coordinated services as well as the establishment of more specialized services. The changes in clientele are also significant. Information haves and have-nots remain, but their information needs are at once highly specialized and interdisciplinary. New demands will be created, for instance, from the changing educational patterns, demographic trends and economic conditions which require responsive services. Such trend will continue, or even more intensified, requiring



greater technical skill and specialization from those who provide services.

Not least are the institutional changes that encompass the emergence of new organizations, either public or private, that compete with traditional libraries and information services. Although the information sector of the economy may continue to grow rapidly, there is an evidence that the government agencies and corporations will be the major organizations involved in the information business. It has become apparent that the library is in fact a part of a large information infrastructure. This necessarily leads to the integration of library with other information systems and services, and while the traditional skills and practices are still needed, there is the demand for new knowledge and skills which are outside the recognized library and information services.

In describing the vision of post-industrial society which he created, Daniel Bell<sup>5)</sup> indicates that a post-industrial society, which a number of countries are currently passing into, is "basically an information society." It is characterized by the fact that the "accumulation and distribution of theoretical knowledge has come to the fore as a directive force of innovation and change." Bell's central thesis is that the managerial elite is gradually being replaced by a "knowledge elite", with increased importance of theoretical knowledge in policy formulation, and the growing influence on society of professional and technical workers. This view seems to imply that there will be an increased importance of library and

information profession to society. Furthermore, the statements by Bell and other sociologists implying a professionalizing society and the growth of a knowledge elite lend to believe the growing status of the profession and the promising future for library profession.

On the other hand, we should not overlook the evidence presented against this theory, i.e., deprofessionalization. As clients gain increased information about their own needs and the type of services which they expect from professionals, the professional loses some of his or her authority and autonomy, and the traditional distinction between client and professional becomes less meaningful.<sup>6)</sup> Another trend which influences library profession is the shift to the substitution of paraprofessional workers in a number of professional positions. All these lead to believe that it is crucial at this stage to take a critical look at library profession with a view to define it in changing socio-technological environments.

The two core characteristics of professionalism are described as "a prolonged specialized training in a body of abstract knowledge and a ... service orientation."<sup>7)</sup> The afore-mentioned changes in the library environment bring about the multiplicity of new dimensions in both knowledge and service of the profession. We must not only comprehend such social and technological changes and their effects and incorporate this knowledge into the philosophy and practice of our profession. Taylor advises that library education "must move from a Ptolemaic universe with the library at the center to a Copernican world view with

information at the center and the library but one of the satellites."<sup>8)</sup>

The professional library education for future should be defined in the framework of information profession which is highly dynamic and diversifying. Such education necessarily calls for diversity in order to be responsive to ever increasing complexity and specialization in information needs and technological capabilities. At the same time, however, it requires unity in generally accepted consensus as to the core knowledge which is central to the diversifying profession.

#### 4. Unity and Diversity for Professional Education

Because of the importance of unity in the diversifying profession, it becomes even more essential to establish a core knowledge on which the profession rests. This may lead to the question of 'core curriculum', which has been the subject of continuing discussion among library educators, particularly in the United States, since the landmarking 1953 Chicago Workshop. However the issue has become crucial with the emergence of new services and technologies relevant to library and the question of incorporating these into curriculum. The 1976 IFLA Standards for Library Schools describes "core" as "fundamental subjects ... mastered first by all students in the School, and should serve as prerequisites for study of specialized subjects"<sup>9)</sup> and identifies twelve areas to be covered in the core study. In reality the practices of library schools show considerable differences in approach, reflecting difficulty in practical terms.

As Robert Hayes so rightly pointed out in his paper for UNESCO/ IFLA Pre-Conference Seminar on Library Education held in Manila in 1980, it is neither feasible nor even desirable to have a "common core", which is "uniform across institutions not even to mention across countries."<sup>10</sup> It goes without question that any educational programme must be considered in its social, cultural, economic and political climate as well as the nature of librarianship in a particular country. However, with the development of network and resultant changes in the profession, It seems vital for the profession to establish the common conceptual base which underlies all manifestations of a highly complex field. Such core should embrace all aspects distinctive to the profession and should be built around principles and concepts rather than the details of skills and techniques which will soon be obsolete. A renewed effort is urged, therefore, not by an individual institution but jointly in global scope, to identify a core of competencies for the changing profession. This is important also from the standpoint of networking in library education in providing base for transferability of students.

Because of the multiplicity of specialized interests within the information profession, a provision must also be made for a selection from a number of specializations which follow the study of core knowledge. And this is the area where individual institution develops its own programme of study depending on a particular environment in which the institution is placed and its requirements. Some library schools are already making



provisions for example specializations in specific types of library and information works, studies of user requirements, operations research, management science and systems planning, intellectual access to information, information theory and coding, and media of communication. This specialization programme will vary largely on the particular situation of an institution: some institutions can afford to expand fields to cover certain specialities from their own resources; whereas others have to rely on other departments or faculties for such specialized studies. Considering the anticipated economic strains, however, it is likely to be difficult for a single school to provide adequate specialty study with its own resources, thus necessitating more interdisciplinary, inter-departmental and even inter-institutional approaches as exemplified by a joint programme with department of engineering, business, communications and such. A danger often lies here that library and information content is sacrificed to become minor study in such programme and an initiative of library school is needed to make it a truly joint study programme.

In relation to this specialization, an internship or field-study becomes increasingly important to supplement more conceptual, theory-oriented courses on core knowledge.

Also the importance of continuing education in this context cannot be overemphasized. The IFLA Standards describes the continuing education as "primarily designed to keep practicing library and information personnel and library educators abreast

of their areas of specialization, or to provide them with training in new fields. Its ultimate aim is to improve library and information services."<sup>11</sup>) With networkings capabilities to provide on-demand instruction to an individual student at home or office, the need for centralized educational facilities becomes open to question. This shift toward a capability for individualized, decentralized, on-demand programme access is even more significant in planning continuing education for professionals.

The primary responsibility of an educational system to the profession is to provide the field with a continuous supply of competent new professionals. At the same time, the profession looks to its training institutions for intellectual leadership. In order to fulfill this function, the institutions preserve and pass on existing knowledge, produce new knowledge, and use such knowledge to define the objectives of the profession. The key to this intellectual leadership is research, which, I believe, is most needed in our profession to identify issues, re-define the profession and the requirements for education for successful challenge to the future.

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NETWORKS IN THE LIBRARY SCHOOL CURRICULUM

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## Networks in the library school curriculum

### Abstract

After defining the concept 'network', the paper discusses the development of library networks in North America and the United Kingdom. Their growing role compels library schools to introduce them into the curriculum but this poses educational and financial problems. Network teaching in North American and British library schools is explored and differences in approach emphasised. Further curriculum developments are foreseen and the College of Librarianship Wales provides an example of present and future course design models.

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# NETWORKS IN THE LIBRARY SCHOOL CURRICULUM

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## INTRODUCTION

Educational programmes which purport to prepare students to enter a particular profession must be designed to take proper cognizance of the current working methods within it. Major changes in practice within the profession should be reflected by changes within the curriculum. Computers - mainframe, mini and microcomputers - have invaded many spheres of library operations and within a relatively short span of years the use of this technology has passed from the exceptional towards the norm. In coping with this development, one of the major problems initially faced by library schools was to decide which particular library's system(s) to use as exemplar(s) at a time when each library tended to computerise on an individual ad hoc basis. The strategy of automating library processes has altered over the years, however, and rather than commission a bespoke system, the typical approach adopted in the 1970s/1980s has been to join an organisation of libraries which has already developed a computer based system. Such library networks have firmly embedded themselves in the fabric of librarianship in the United States and to a lesser (although growing) extent in the United Kingdom, and entrants to the profession will come in contact with them sooner rather than later. To some degree therefore, library schools are faced with a much clearer picture of what kinds of systems to base their teaching upon, although the complex nature of the networks introduces a new range of problems. This paper will address itself to a consideration of how library schools in both the United States of America and the United Kingdom presently treat library networks in their curriculum together with some views on how the topic might be treated in future years at the College of Librarianship Wales.

## Definition of networks

The term 'network' has been used to refer to quite different physical entities. Tedd distinguishes between physical and logical networks (1). A physical network is described as a data communication system such as TYMNET or TELENET while a logical network refers to those systems which involve cooperation between members of the network. Kent defines networks to cover the above as well as the online search systems such as DIALOG and ORBIT (2). The term network in fact implies a linkage or association between the constituent members and this aspect therefore should exclude DIALOG and ORBIT from being considered as networks

because the participating libraries have a linkage only with the appropriate computer and not with each other. TYMNET and TELENET are undoubtedly networks but as far as libraries are concerned they are simply telecommunications systems which can be used by libraries but over which libraries themselves have no direct control.

Stevens states that a library network should possess the following characteristics:

1. Be supported primarily by payment for services from participating libraries
2. Be directed by full time staff
3. Be controlled by an independent governing body with a high level of participation from participating libraries
4. Be built around a cooperatively maintained bibliographic database in machine-readable form
5. Be linked online by a telecommunications system (3).

This article in the main will deal only with networks which meet the above criteria although some modification of the criteria will be required when considering the situation in the United Kingdom. On the other hand, telecommunication networks such as TYMNET and TELENET, and online search systems such as DIALOG and ORBIT, will not be discussed.

#### Library networks in North America

The phenomenon which was most instrumental in creating library networks was the development of the MARC format by the Library of Congress and the subsequent availability of Library of Congress cataloguing data on MARC tapes. Libraries experimented with the MARC tapes on an individual basis and while a number of uses for the tapes were identified the main one was in the area of cataloguing. Libraries mounted the tapes on their local computer and were able to extract cataloguing records, thereby reduce the amount of original cataloguing. In so doing they started to create bibliographic databases but it soon became evident that few libraries could afford to maintain such rapidly expanding databases and the impetus for the establishment of cooperative library networks emerged (4).

In the mid 1960s a number of networks were created but the most successful, OCLC (Ohio College Library Center), now called OCLC Online Computer Library Center Inc., subsequently developed to such an extent that it dominates the American scene. It was formed in 1967 to meet the needs of academic libraries in Ohio and provided an

offline catalogue card production facility based entirely on the available MARC records. In 1971 the online cataloguing system was initiated and member libraries could both input their own MARC records and have access to all records created by other member libraries. The operational success of OCLC soon led to the discarding of the limited Ohio perspective and by 1980 there were over 2,500 member libraries from Alaska to Puerto Rico and from Maine to Florida (5). An interesting feature of the OCLC system has been the emergence of a series of OCLC service centers which are themselves networks established either on a state or a regional basis. These service centers act as brokers and handle all matters concerned with the provision of OCLC services to their member libraries.

The shared cataloguing system is an immense operation in itself but OCLC also offers its members a range of other services. An interlibrary loan system, whereby member libraries can be supplied with library locations of sought materials, was a logical outgrowth from the sharing of data. A serials control subsystem is also operational and an acquisitions system has been developed and is now being tested. OCLC's claim that it provides libraries with integrated automated library systems is becoming increasingly difficult to refute.

OCLC dominates the American scene but there are three other networks which challenge its monopoly: Washington Library Network (WLN); Research Libraries Information Network (RLIN) and University of Toronto Library Automation System (UTLAS) (6).

WLN began operations in 1977 and is the smallest online network having only 65 members. In addition to the online cataloguing system WLN offers an acquisition subsystem. The database is much smaller than OCLC but it is claimed that the quality of records is more uniform and subject access to records is possible.

RLIN - a project of the Research Libraries Group - offers member libraries facilities for cataloguing, acquisitions, fund accounting and serial control. An important part of the philosophy behind RLIN is resource sharing, and RLIN is seen as the mechanism for the implementation of this principle, although as yet it remains no more than an intention.

UTLAS is second in size after OCLC but instead of maintaining a large shared database, libraries have their own databases and decide whether to let other libraries use their records. In addition to the cataloguing system there is a minicomputer-based circulation system and an acquisitions system.

These library networks involve cooperation between member libraries by sharing records supplied by the Library of Congress and allowing other libraries to use records they themselves have created. The cooperative element is extended further by providing interlending subsystems and, in the case of RLIN, perhaps the ultimate level of cooperation will involve resource sharing amongst member libraries. In addition, the networks are creating various subsystems leading towards integrated automated processes in libraries. OCLC is close to achieving this aim and the other networks are following its footsteps.



### Library networks in the United Kingdom

The library networking scenario in the United Kingdom comprises three cooperative systems which are currently operational to some degree, plus a national information service. The three library networks are: BLCMP (Library Services) Ltd., formerly Birmingham Libraries Cooperative Mechanization Project; SWALCAP (South West Academic Libraries Cooperative Automation Project); SCOLCAP (Scottish Libraries Cooperative Automation Project) (7). The national information service, BLAISE (British Library Automated Information Service), is responsible for all the automated library services provided by the British Library (8). In addition to supplying the MARC exchange tapes used, for example, by BLCMP for the creation of its database, BLAISE provides online access to all available UK&LC MARC records as well as a complete catalogue production service - LOCAS (Local Catalogue Service). The BLAISE MARC database is used by SWALCAP and SCOLCAP and the latter also utilises the LOCAS service.

BLCMP was founded by the University of Aston, University of Birmingham and Birmingham Public Libraries and funded initially by the Office of Scientific and Technical Information. It was created to exploit the MARC records provided at that time by the British National Bibliography (BNB) and the Library of Congress and until recently it only provided a batch processed catalogue production facility. The BLCMP database includes all available BNB&LC MARC records as well as EMMA (Extra MARC records) created by all member libraries. The first catalogues were received by the three original libraries in 1972, from 1974 the service was made generally available, and by 1981 it had thirty one members. BLCMP has recently developed a telecommunications network, BOSS (BLCMP Online Support Service), which enables libraries to be connected via a satellite centre to a computer at BLCMP. Unlike OCLC, however, BLCMP holds only a part of its database online (the latest 12 months of UK MARC tapes) and searching of the rest of the database is by overnight batch processing, the resulting records being made available for online editing the following day. In addition to cataloguing services, BLCMP has designed a circulation system, at present being tested at Manchester Polytechnic, and an acquisitions and ordering module is to be incorporated into the system in 1982. The future for BLCMP is now most promising.

The concept of cooperation between academic libraries in the South West region of the UK was conceived as long ago as 1969 but SWALCAP only became operational in 1976 in the libraries of the Universities of Cardiff, Exeter and Bristol. It has now expanded, however, to include 17 member libraries. In contrast to the strategy adopted by the networks discussed above, SWALCAP first developed a system for circulation control. A system for online cataloguing did not emerge until 1978. More fundamentally the SWALCAP system does not maintain its own database of potential MARC records but only holds those records representing stock items in member libraries. MARC records are supplied on magnetic tape either by BLCMP or by the national information service, BLAISE.

"The primary reason for establishing SCOLCAP was the belief that certain library services, particularly those concerned with online acquisitions and cataloguing, may be best provided using national services mediated through regional centres" (9). Planning began in 1976 and there are presently 21 members. The telecommunications aspect of the system, however, has only recently been finalised and is scheduled to become operational early in 1982. Meanwhile, member libraries have used the BLAISE/LOCAS system to create a database of library holdings, at present comprising over 600,000 titles. When fully operational, libraries will be linked to the SCOLCAP computer in Edinburgh which itself will have a direct link to BLAISE and its huge MARC database. Requests for records unavailable in the local database will be automatically switched to BLAISE and if the search is then successful records will be read back to the local computer for editing. SCOLCAP, unlike either BLCMP or SWALCAP, has not developed local facilities for actual catalogue production but instead uses, and intends to continue to use, the LOCAS service.

Library networks in the United Kingdom are much smaller in terms of membership than their counterparts in North America, although actual membership expressed as a percentage of possible membership is quite low in both cases (10). In the United Kingdom, however, the national information service plays a role which is not paralleled by any organisation in America. Unnecessary duplication of services makes sound economic sense for a small country and with the development of telecommunications aspects in all the networks it is reasonable to assume that cooperation between the networks and the national service will increase.

#### The library school curriculum

The development of library networks poses a number of questions for curriculum planners in library schools. For example:

- what exactly should be taught about the networks?
- should all networks be treated at the same depth?
- what sort of practical experience should be given?
- how much time should be devoted to them?
- where should they be placed within the curriculum?
- should cataloguing aspects be taught on a cataloguing course separately from the other aspects of the network or should library networks be taught as a separate and integrated course?

At the outset it is important to identify an important difference between American and British Library education. The former tends to place more emphasis on preparation for jobs than its British counterpart. This emphasis is clearly stated by Mignon in his report on the appropriate approach to adopt in the teaching of online bibliographic searching. He refers to "operator training" courses which aim to "qualify a graduate for the responsibilities of an entry level position as an online search specialist" (11). Vickery expressed the different attitude of the British library schools when he stated, "it is unlikely (and even undesirable) that specialised training to produce 'intermediaries' - information specialists skilled in aiding enquiries in online searches - can be carried out within the framework of general professional education for library/information work" (12).

### North America

The importance of preparation for jobs in online cataloguing in the American context is emphasised by Allan who points out that a working knowledge of OCLC is often a job prerequisite, and that many students expect to leave library school with a working knowledge of on-line cataloguing. Library schools which do not meet this practical requirement are likely to experience problems in maintaining their accreditation (13).

American library schools appear to recognise the significance of networks, especially OCLC, and do provide instruction at different levels in various courses. Harter was primarily concerned with online systems in general, rather than with the kind of networks under discussion in this article, but he found that 28 out of 46 accredited library schools surveyed in 1977 used the OCLC system (14). Allan analysed a survey on approaches to teaching online cataloguing in 58 accredited library schools (also in 1977) and found that 47% of the schools emphasized online cataloguing in their curriculum (15)\*.

These figures only provide general indicators as to how networks feature in the curriculum. Information on more specific aspects such as the exact course content, teaching methods, etc. is more illusive. Allan did report that 67% of the schools taught record input and 73% taught record tagging (16). An interesting point, although not altogether a surprising one, is that only 5% of the schools opposed teaching such skills, pointing out that work at this level was more appropriate to on-the-job training.

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\* A score of 10 was allocated for positive answers to 7 pertinent questions. 10 points were also allocated for each course in which more than 30 minutes was devoted to online cataloguing. A score over 60 was regarded as the indication of emphasis.

Library school curricula still generally subscribe to a tripartite division into management studies, bibliographical studies, information storage and retrieval studies. Library networks, like other new additions to the curriculum such as online searching, pose a number of problems because they embrace aspects from more than one of these traditional divisions. For example, while OCLC is primarily a catalogue production system which falls within the remit of information storage and retrieval studies, its other sub-systems - interlending, circulation, serials - are usually regarded as administrative aspects which fall within management studies. The BLAISE system, in addition to the catalogue production operation using MARC records, includes a range of databases on medicine, education, etc. Online searching of BLAISE databases is often seen as an area of study falling within a bibliography course in the same way as is searching on systems like DIALOG and ORBIT. In teaching about networks it is important at some stage to discuss the governance of the networks and the kinds of decisions which need to be made when deciding to use one network rather than another. These are essentially management decisions but they are based to quite a large extent on knowledge of the services offered. Curriculum planners, therefore, are faced either with teaching various aspects of library networks in the appropriate mainstream courses, thus breaking the topic into a number of unrelated parts, or treating it as a completely separate course, thereby failing to relate it to other sections of the curriculum.

Evidence from American schools indicates that both approaches are adopted. In discussing OCLC, Allan reported that it was common to teach the topic in two different courses. She goes on to say that "Sixty-three schools listed cataloguing-related courses, forty-eight listed courses pertaining to automation, eighteen listed technical service courses ranging from type of library to indexing and abstracting" (17). Eyre visited fifteen institutions in North America and reported that nine of them offered separate courses on library networks although some institutions use the term to embrace technical as well as cooperative aspects of networks (18).

Very little has been written on teaching within individual schools. Bellardo et al at the College of Library Science, University of Kentucky, describe a course entitled "Computer-based bibliographic networks" in which students follow three distinct units; one unit devoted to a cooperative network (OCLC); a second unit to a subject-specific system (MEDLINE); a third unit on a multiple-database system (DIALOG) (19). Each unit lasting 5 weeks met for three hours per week. The OCLC unit had two goals;

"The first goal was to provide an introduction to cooperative automated library networking - history, purpose and current status - emphasizing OCLC, but covering other regional networks as well. Secondly it was hoped that a series of online exercises would enable students to develop some skill in the use of the OCLC 100 terminal and familiarity with the OCLC database" (20).



Time was divided fairly equally between discussion of such topics as; the effects of networks on libraries' technical and public services; the relationship between OCLC and its affiliate networks etc, and online practice which covered editing and inputting practice.

A number of manuals and teaching aids are available in this area but they are mainly devoted to OCLC (21). At Kentucky teaching was supported by Self-Instructional Introduction to the OCLC Model-100 Terminal by B. Juergens and the SOLINET Terminal Training Manual (22). Abrera and Davis describe the use of programmed instruction in teaching OCLC database searching and Abrera has recently published a programmed text on monograph searching using OCLC (23). Manheimer has compiled a workbook specifically designed to provide students in library schools and practitioners with a practical introduction to the mechanics of bibliographic searching, card modification and input on OCLC (24). In addition to these printed teaching aids Kent State University has produced a number of videotapes on OCLC (25).

#### United Kingdom

Library schools in Britain, helped initially by the British Library Research and Development Department, responded positively to the curriculum demands imposed by the development of the various online search services. All 16 library schools possess the appropriate equipment and passwords to access at least one service and most students are now taught something about searching online databases and see a live or recorded search during their course of studies (26). Much of this teaching, however, is geared towards the subject searching of bibliographical databases rather than online cataloguing. The BLAISE system is the natural system for British library schools to use for online cataloguing because of its relative ease of access (in fact all British library schools are in possession of BLAISE passwords) but the system can be used for subject searching as well as for data manipulation. Tedd states that "most of the schools aimed to show how online systems can be used for bibliographic checking and for the creation and amendment of catalogue records" but information on how much time is devoted to the topic, what exactly is covered and on which courses is not provided (27). Eyre states that as far as library networks are concerned British library schools only devoted one or more lectures to the topic and incorporate teaching under computer appreciation, library automation or on-line systems (28).

Some British library schools have treated online cataloguing in considerable depth, as evidenced by the teaching aids developed by them. Wood describes BLAISERS, developed by Sheffield University, which demonstrates the retrieval of MARC records and the editing of records for catalogue use (29). The Polytechnic of North London received a grant to explore the use of the Hewlett-Packard 2645A terminal in teaching MARC cataloguing (30). Other work, notably by Leeds Polytechnic, has been carried out on BLAISE as an information retrieval as opposed to a cataloguing system.

It takes time for curriculum changes to be reported and in the interim period further changes may well have been implemented. The recent development of the telecommunications element of BLCMP means that hands-on experience is potentially available to library schools. When SCOLCAP acquires its facility in 1982 all the networks will have online working. Access to the networks will remain a problem, however, because as far as is known it will only be available to those library schools whose parent institution is a member (the parent institutions of 8 library schools are presently members of library networks).

#### Membership of Library Networks

| <u>BLCMP</u>                   | <u>SCOLCAP</u>                                        | <u>SWALCAP</u>                    |
|--------------------------------|-------------------------------------------------------|-----------------------------------|
| Birmingham Polytechnic         | Newcastle Polytechnic                                 | College of Librarianship<br>Wales |
| Brighton Polytechnic           | Strathclyde University                                |                                   |
| Manchester Polytechnic         | Robert Gordon Institute<br>of Technology,<br>Aberdeen |                                   |
| Polytechnic of North<br>London |                                                       |                                   |

Of the members of BLCMP and SCOLCAP, only Birmingham Polytechnic has announced an intention to obtain a BOSS terminal and use the BLCMP system. It will be a number of years before the implications of developments in this area become clear but a report of experience at the College of Librarianship Wales suggests the kind of progress which might be made in curriculum development.

#### Practice at the College of Librarianship Wales (CLW)

CLW is an independent institution established in 1964 and is part of the School of Library and Information Studies of the University of Wales. Three main programmes are offered: a 3 year undergraduate programme involving study of librarianship and one academic subject (46 subjects are currently offered) which leads to the degree of Bachelor of Librarianship (B.Lib.); a 9 months Postgraduate programme which leads to the Diploma in Librarianship (Dip.Lib.); a 1 year higher degree programme which leads to the Master of Librarianship (M.Lib.).

Until this academic year, teaching of library networks on all three programmes has followed the pattern identified by Eyre (31). For example all first year undergraduate students have received 2 or 3 lectures on MARC and cooperative cataloguing. This has been supported by recorded search shown on a Texas Instruments Silent 700 terminal with taping and

play-back facilities, demonstrating the creation and amendment of records on the BLAISE system. Students electing to follow the course "Advanced cataloguing and classification" in the final year of the B.Lib. programme have spent 4-6 hours on MARC tagging but difficulties experienced with the availability of the online cataloguing part of BLAISE together with the relatively high costs of using the system (as access to the nearest network node involves a trunk call) have impeded the provision of hands-on practice. A recent development in the technical services section of the library has now created the opportunity to increase the amount of hands-on experience through the use of a library network.

The College joined SWALCAP in September 1981 and is now using its cataloguing system. Two Hazeltine 8000 series terminals in the library are linked by landline to an ALPHA LSI 2/20 minicomputer in the library of the University College of Wales, Aberystwyth which has been a member of SWALCAP since 1979. The minicomputer is itself linked by Post Office line to the SWALCAP mainframe computer in Bristol. The availability of this facility has immediately led to some alterations in current teaching programmes. For example, on the "Advanced Cataloguing and Classification" course, in addition to lectures on cooperative cataloguing, networks (2 lectures) and MARC practicals (3 sessions), it is hoped in the 1982 Lent term to include a demonstration on the use of the SWALCAP system by CLW Library, and hold a seminar, led by a member of the library staff, on the kind of decisions which libraries must make before joining cooperatives. These are small steps and it is noticeable that no hands-on practice is included. In this present academic year there are sound practical reasons for not incorporating any hands-on experience. The college library staff are themselves new to the system and are heavily involved in training library operatives. Additionally they must devote considerable time to converting the existing card catalogue into machine readable form. This task, however, should be well under way by the beginning of the 1982/83 academic year and by then the library staff will have developed a considerable familiarity with the system. Furthermore, a regular pattern of operation should have emerged, enabling teaching and operational requirements to be accommodated.

Student numbers pose an obvious problem. Currently well over 100 students follow the Dip.Lib. programme and at least 60 students are registered on each year of the B.Lib. programme. Access to the terminals becomes inevitably extremely difficult.

The most probable next step is to provide only those students taking particular elective courses with any hands-on experience on library networks. The most eligible course on the B.Lib. programme is the "Advanced Cataloguing and Classification" course, although careful planning will be necessary to cope with the numbers involved. In the academic year 1981/82 45 students are following this course. At present there is no suitable elective course on the Dip.Lib. programme although the recent developments have created an impetus to establish one.



The most likely area for development in the near future, however, is the M.Lib. programme where students either write a thesis or elect to follow four courses of guided reading from a list of seven courses, together with a dissertation based on one of the areas. There is not, as yet, a course on Library Networks. One course, "Automation in Libraries", because of its wide remit, covers library networks in a general sense; another course, "Computerised bibliographic searching", does not cover the kind of networks discussed in this article, but does involve students in considerable hands-on experience in bibliographic searching. The potential availability of hands-on practice on a library network offers the possibility of a new course on library networks drawing together some of the academic content of the course on "Automation in libraries" together with the practical approach of "Computerised Bibliographic Searching".

Some of the ideas noted above are no more than the authors' conjectures and are in no sense a statement of a planned future at CLW. Before any decisions are taken, curriculum changes will have to be discussed by the appropriate academic bodies and the financial implications worked out. Conflict, too, between teaching needs and the needs of an operational library will need to be carefully considered and resolved. The challenge and opportunity exist, however, and should be positively grasped.

#### CONCLUSIONS

The literature suggests that American library schools have taken more cognizance of library networks in the design of curricula than have their British counterparts. In a number of cases they have developed separate courses specifically concerned with library networks, although the tendency to incorporate the topic in existing courses still is the norm. They have, of course, been considerably helped by the dominant role of OCLC which is practically synonymous with American library networks and is one that students will either have used prior to joining the school or will very likely meet at an early stage in their career. Additionally the telecommunications component in the system has been available for a relatively long period and access to the system is easily achieved. Because the concept of library networks is less well established in Britain and because no single network has the degree of monopoly held by OCLC, there has been much less pressure from either the profession at large, or the students themselves to devote a considerable part of the curriculum to this topic. Furthermore, the absence of a telecommunications element in, for example, the BLCMP system until recently has meant that the vital area of hands-on experience for editing etc, could not be provided in the context of an operational network. British library schools, of course, have not ignored the issue of online cataloguing but have taught the topic by using appropriate facilities on the national system BLAISE. But BLAISE is not, at least for the time being, a library network as defined above and therefore it is not possible to explore issues such as network governance, resource sharing, etc, using BLAISE as the exemplar.



Recent developments, however, suggest that British schools will find it easier to use genuine networks in the way that their counterparts have been able to in North America. The BOSS system has now turned BLCMP into a library network on the American model and the SCOLCAP system plans to create its physical network by 1982. Library schools should be able to gain physical access to all these existing networks. Some major problems inevitably must be solved if this situation is to be adequately exploited by all library schools. The present charging system of the library networks, based on annual subscription plus usage charges, means that only those library schools whose parent institution is a member of the network are able to gain access. Nearly half of the UK library schools are thereby denied access to any system. Even where access is possible equipment and usage charges may be sufficiently high to deter usage. If schools are to develop the kind of programmes on library networks that the profession is likely to demand, it is imperative that the necessary financial resources be made available. The British Library Research and Development Department provided financial support for the schools to develop the teaching of online bibliographical searching and educational discounts are offered by some systems and database producers. It is encouraging that the director of SWALCAP has already shown an interest in assisting teaching in this area and it is hoped that those responsible for the networks will realise that if they wish teaching in this area to be extended they must make every effort to minimise the charges which fall upon library schools (32). Library schools have already shown that they can respond imaginatively to the challenge of new technology in areas such as online searching and there is no doubt that with the proper financial encouragement a similar response will be forthcoming in the important and growing area of library networks.

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Division:

Section on Library Schools and Other Training Aspects

Education for the Information Industry  
and  
Implications for Library Schools

by

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Healing  
69

Schools and programs designed to educate persons for careers in librarianship and information science constantly confront major changes in society and the way in which society views "information". Certainly these changes do not occur overnight and many schools and programs have had time to adjust to the changes. However, in the last five or six years the rate of change has been accelerating, and it appears that the rate will continue to increase.

What are some of the major changes that are taking place? Two stand out as being most important. First, business and society now view information as a valued resource that must be managed if the business or society is going to thrive; a corollary is that an "information industry" is growing that promotes goods and services that are said to improve productivity. Second, technological advances in the area of information processing and handling are going forward rapidly, and there is an increasing concern and recognition that these technologies must be capable of integrating at least four categories of information - data (numeric), text (words), images (pictures), and voice (sound). Other changes are: the cost of technology is coming down to the point that more and more people have access to information technology in their offices and homes; the concept of what information is and how it should be handled in an organization is expanding; companies and individuals are taking advantage of the law of least effort and selling information services to persons who could get the same information for free if those persons were willing to spend time and energy in a library; and finally, the cost and volume of information have risen so much that organizations are all beginning to realize that they can no longer attempt to acquire and store (even for a brief period of time) more than a small percentage of the total resources available to them.

Such changes have significant implications for library schools. At the University of Denver Graduate School of Librarianship and Information Management (GSLIM), we have been examining these trends and have developed a proposal for greatly expanding our degree programs. In essence, the proposal calls for the creation of a new College at the University of Denver (College of Information Management), one that will offer the following degree programs: Bachelor of Science in Information and Records Management, Master of Science in Information Resource Management, Master of Science in Communication Technology, and Master of Science in Librarianship (currently our only degree program). This article will only discuss the new degree programs. Currently the proposal is in the hands of the University administration, whose attitude has been very positive, and we expect to start offering the new course work by September 1983 at the latest. The following is based upon work that was done for the proposal and reflects our (GSLIM) assessment of the type of educational program that will be required to meet the challenge of the Information Age in the United States.

## Information Industry Growth and Character

In the last 30 years, there has been a significant shift in the composition of the American workforce. In 1980, blue collar workers represented less than 34 per cent of the total workforce (1), while white collar workers comprise more than 50 per cent. It seems likely then, with the advent of automated offices and a variety of electronic data and information handling systems, that the percentage of white collar clerical employees will also decline sharply. One estimate predicts a decline of 20 to 30 per cent for this class of worker by the end of the 1980s (2). Where will these workers go, and what are the employment prospects for future workers?

Many will go into the information industry. A recent study of "information professionals" identified 1,640,000 persons currently working in the United States in the information industry (3). That figure will go much higher. In a report prepared for the U.S. Department of Commerce, M. Porat illustrates the dramatic growth of information service work in the last 120 years (4). Information industries grew from 8 per cent in 1870 to 41 per cent of the total U.S. workforce in 1980. An article summarizing a U.S. government study of the information industry indicates that "the increase in productivity in the information industry accounts for a quarter of the total increase in U.S. productivity; in U.S. Exports, information equipment and services are second only to agricultural products; more than half of the U.S. labor force is occupied in information related jobs" (5). Another important fact coming from all these studies is that the vast majority of information workers now are employed in the private industrial sector (7 of 10 persons -- the actual percentage is 71). The remaining 3 persons work for governmental agencies (2 for state and local, and 1 in federal agencies).

The Debons-King Study (which identified 1,640,000 information professionals) also defined eight major "workfields" associated with information transfer and the information industry (6). These workfields are -- in order of the number of information professionals employed -- computer, management support, library, information services, education and training, research, financial, and technical publications. Although not mutually exclusive, the fields do represent what practicing information professionals view as their primary information services activities. Within the workfields, there are six functional areas; the GSLIM degree programs that relate to that area is identified in the brackets:

1. "Managers of Information who plan, develop, coordinate, and control information programs, and the human and material resources needed for their implementation." (The Master of Science in Information Resource Management will prepare people for this area.)
2. "Information Operations Coordinators who perform functions with regard to (a) the data or knowledge base and (b) the end-user,

in the installation, operation, maintenance, and control of information systems, their equipment and processes." (The Bachelor of Science in Information and Records Management will prepare people for this area.)

3. "Information Systems Specialists who analyze information problems, and who design, implement, and evaluate solutions." (The Master of Science in Communication Technology will prepare people for this area.)
4. "Information Intermediaries who work between the end-user and the data and knowledge sources, helping the user reach an informed state." (The Master of Science in Librarianship and Bachelor of Science in Information and Records Management will prepare people for this area.)
5. "Information Theorists who are concerned with the development of laws, theories, philosophy, and sociology of information environments." (All the degree programs will prepare some people who will eventually work in this area.)
6. "Educators of Information Workers who provide education and/or training for the above five categories of information professionals and for non-professional information workers." (7) (All the degree programs will prepare some people for this area.)

The Debons-King study also identified eight functional areas in which the information professional operates. These areas are:

data/information preparation on behalf of others;  
data/information analysis on behalf of others;  
searching for data/information on behalf of others;  
information systems analysis;  
information systems design;  
operational information functions;  
education/training of information workers;  
information research and development.

Several of these areas traditionally have been within the scope of education for librarianship. In particular, searching for data/information for others has always been a library function, as have the operational aspects and education and research for librarianship. What has happened is that, with the tremendous growth of data/information and new information technologies, user needs have developed that require a broader view of what information/data carrier media are and how they interrelate. This is a major implication for curriculum designers in the field of librarianship and information management.

Users also need assistance in the analysis (and even preparation) of data/information for them. In the past, the focus of information service has been on the individual user coming to the library. We will continue



to have that type of activity in public and educational institution libraries. However, business and governments have come to realize that data/information needs to be selected, acquired, controlled, and disseminated, even if there is no single physical space assigned to those activities and having the label "library". The proposed new College will provide the diversity of educational programs required to meet the needs of a wide variety of organizations for information professionals. It will emphasize the transfer and use of information regardless of organizational setting or technology used to transfer information.

We propose to provide a focal point in what is now a scattered field of training information professionals. In fact, if the University of Denver implements this proposal, it would be the leader in an emerging field of education. Such a college would help to prevent the "singular cultural outlook" (library or information center, or computer, or video - as examples) that concerns many information specialists and educators. We plan to build a broad general base at the undergraduate level and to enter into intense specializations only at the graduate level.

#### Rationale for the New Programs

Presently, GSLIM (like other such schools around the United States) educates people for only a small segment of the information industry. Our program currently produces librarians in the traditional sense of the word (which is still the School's major program). We educate a few "information managers," who primarily find employment in "special" libraries (collections of print and nonprint materials, and recently database systems that support the business activities of large companies) and who represent a small but growing number of the School's graduates. And we do educate persons knowledgeable in the book trade through our nationally recognized Publishing Institute and Out-of-Print Seminar (each one "graduates" about eighty-five persons a year for these two aspects of the information industry). Thus, we currently do cover several segments of the information industry. We now propose to expand our programs to include most of the major segments of the information industry.

We believe that within the information industry a "core" of knowledge exists that cuts across all industries. The core consists of understanding:

- how information is created, produced, and disseminated;
- how information is used and manipulated by people and machines;
- how information is organized, controlled, and acquired;
- how information is stored and retrieved;
- how information is managed and marketed.

From understanding these key issues, an individual can move on to specialize in one of several broad areas that would be of value in a large number of primary information industries.

The core material will be covered in the undergraduate program, where the instructional costs are lowest. It also creates the foundation upon which to build a true graduate program. Upon completion of the undergraduate program, a student has excellent employment prospects with a reasonable salary and, after a few years, has the opportunity to complete graduate-level work in the field with a true specialization.

#### Degree Programs:

##### Bachelor of Science in Information and Records Management

The undergraduate program will lead to a Bachelor of Science degree in Information and Records Management. In this program, the core concepts of information services will be taught and will constitute the prerequisite courses for all graduate degree programs. The undergraduate program will contain general education requirements similar to those bachelor's degree programs of the University of Denver's College of Business, because the information professional needs background in the social sciences, humanities, and sciences as well as information studies.

We propose to use existing University of Denver courses whenever possible, thereby avoiding undesirable duplication and expense to the University. The program will consist of 183 credit hours, with sixty hours in the major field of study.

The role of the information and records manager (I & RM) with an undergraduate degree is primarily that of control and retrieval of information for use by others. The information and records manager must be able to manage records and information for an organization. In the terms used in the Debons-King study, the I & RM graduate would find positions as an information operations coordinator or information intermediary.

Three broad areas of knowledge are required: the nature of data and information services and handling; the nature of information seeking and user requirements; and the operation of information systems in an organizational setting.

Central to the role of the information and records manager is an understanding of the nature of data and information, their sources, and their handling. The information and records manager must have the ability to plan, organize and supervise the processing of information and records from their creation and acquisition to their final use and disposition. The ability to evaluate information and sources of information and a knowledge of appropriate technologies and systems for the control of information are essential.

Second, the role requires information and records managers who can both diagnose information requirements and provide appropriate and timely information for both present and anticipated requirements. The information

and records manager serves as the catalyst in the process. This requires a thorough grounding in the behavioral aspects of information use, information needs analysis at the individual and organizational levels, the economics of information, (including information demand and cost/benefit decisions), and both policy and organizational theory as these relate to the use of information and the allocation of resources to information services.

Finally, the information and records manager uses those management and organizational skills essential for planning, control, and integration of the information services and records divisions as a unit within the organization.

#### Educational Requirements for I & RM

Our program will provide the knowledge for designing and implementing information processing and service appropriate and timely for an organization, public or private.

I & RM graduates will be able to:

1. select, store, retrieve data and information
2. employ appropriate technology and systems for the control of information
3. plan, organize, supervise the processing and disposition of information and records
4. evaluate information and information sources
5. analyze information needs
6. interpret information seeking behavior and information use
7. apply principles of the economics of information to the information needs of an organization or individual
8. develop and implement information policies and procedures
9. apply organizational theory to information handling environments
10. allocate organizational resources to information services
11. control, operate, and evaluate information services and records activities.

#### Graduate Programs

We will maintain our master's degree in Librarianship and add a Master of Science degree in Information Resource Management and a Master of Science degree in Communication Technology. All three master's degree programs will have a set of prerequisite courses that will be part of the undergraduate degree program. These prerequisite courses will address the core issues in information transfer discussed on page 4.

#### Master of Science in Information Resource Management

Information Resource Management is a relatively new field. In fact, it does not have a description in the U.S. Department of Labor Occupational Handbook. Our description is based upon documentation submitted to the

U.S. Office of Personnel Management in April 1979. At the time of submission, the job title was to be Information Manager. Professional discussions and debate over the proposed series have produced the conclusion that, since the emphasis of the career is to be the management of information resources, the word resource should be included in the title. Just when the series will be accepted is difficult to predict. What is not difficult to predict is that it will be accepted. Acceptance will be fairly soon because, with the passage of U.S. Public Law 96-511 (the Paper Reduction Act of 1980), "the information resources management approach is now required for United States Federal agencies and departments" (10).

An information management program encompasses the coordination and synthesis of the many disparate functional activities in any organization that have as their common purpose the task of meeting the organization's information requirements. These activities may include, for example, libraries and information centers, microform programs, printing and publishing operations, copying and reproduction facilities, paperwork simplification and reduction programs, reports control and forms management programs, management information systems, scientific and technical information systems, and other related activities.

Like the organization's other resource managers -- its personnel, financial, and physical plant managers -- the central task of the Information Resource Manager is to see to the efficient acquisition, handling, and use of information resources, as well as the effective application of those resources to meet the organization's information requirements, and ultimately help it to achieve its goals.

"Information resources" means all of the records and documents, facilities, equipment, personnel, supplies, systems, and other machinery needed to collect, store, handle, and disseminate the information the organization uses. Ultimately, all of this information handling system is utilized to furnish accurate, timely, complete, and relevant information to users for decision-making and problem-solving throughout the organization. So, in the end, the Information Resources Manager must be concerned with both resources and the usefulness of the information itself.

Information resources -- like all human, physical, and financial resources or assets purchased and utilized in pursuit of organizational objectives -- must be planned, managed, and controlled at each stage of the information life cycle to be of maximum value in managing the organization. Thus, not only must the Information Resources Manager see to providing needed information and to filling unmet needs that may exist, but also to the elimination or reduction of unnecessary information activities, information flows, and information holdings, as well as insuring that proposed new information collections and handling systems are limited only to those of the highest priority and demonstrated need. Such continuous monitoring of obsolete, useless, or ineffective information applies to all data media or forms, including, for example, single monographs or a set of periodicals, a major online information retrieval system, a major data bank



or data base, a statistical demographic survey, an inter-agency report, a records retention schedule, a new or revised "form", a microfiche collection, and so forth.

A primary responsibility of the Information Resource Manager is to serve as the principal advisor to top and middle management levels by providing technical expertise and counsel on such matters as information plans, information budgets, information security measures, reliability of information sources, cost effective information products and services, acquiring and introducing new information technologies, and the development and use of a comprehensive information management system for the organization.

Finally, while the treatment of information as an organizational resource has many similarities to the treatment and management of other organizational resources -- human, financial, physical, and natural -- there are critical differences which the Information Resource Manager must keep in mind. For one, information content cannot be separated from its handling/transfer/dissemination medium. For another, the meaning, and therefore ultimately the value, of information is at times subjective and judgmental. And for a third, access to information resources is not exclusively an economic matter, but involves political, social, and other considerations as well.

#### Educational Requirements for I & RM

An Information Resource Manager should complete an educational program in which the individual secures: a general background knowledge of information programs; an understanding of both the conceptual and the working interrelationships between and among key attributes of information and data (such as subject, scope, unit of measure, time, source, and quality/precision); an understanding of the nature and characteristics of major classes of information holdings (such as data, documents, and literature); an understanding of the trade-offs between alternative collection, handling, storage, and dissemination media (such as hard copy (manual), magnetic tape, paper tape, microforms, video disc, image and facsimile, graphic/pictorial, and so forth); an understanding of the economics of information; and an understanding of the social, economic, and political impact of national information laws, regulations, and policies (such as the U.S. Freedom of Information Act and the U.S. Privacy Act, whose goals are to insure that information that government collects from citizens, businesses, and others is safeguarded to preclude inadvertent or fraudulent disclosure).

Information Resource Managers should have a demonstrated ability to deal satisfactorily with others and to negotiate with operating personnel, both line and staff. It is not enough to be able to locate and acquire data, documents, and literature resources. The Information Resources Manager must also have the ability to recognize information problems and to plan for and carry out their resolution, as well as to see where information flows and holdings are not meeting the needs of users.

Graduates of the degree program in Information Resources Management will be able to:

1. utilize the principles, concepts, methods, techniques, approaches, and systems of information management;
2. plan, direct, and coordinate difficult and complex information handling programs that may include, for example, word processing, digital data, analog data, microforms, both batch and on-line modes of input preparation, real-time applications, automated cataloging and index preparation, the development of tables and graphs, and the preparing of suitable voice-visual-graphic materials for presentation of results to management levels and individual users;
3. develop, apply and adjust information plans and policies to attain organizational objectives, insuring that the benefits and values that accrue from information use at least match, and ideally exceed, the burdens and costs imposed on all of those from whom it is collected and who must process, store, and handle it;
4. select, develop, and supervise a subordinate staff, including the necessary range of technical and speciality skills needed;
5. establish and maintain effective working relationships with all levels of management and with individual users and user groups;
6. make oral and written presentations in a clear and concise manner, and to communicate to officials and users effectively so that they understand how their requirements are to be met by systems and technologies that may be quite foreign to their understanding;
7. apply sound, independent judgment in the solution of information problems and in the administration of an information program;
8. acquire a broad knowledge of the organization's total operating programs, and see how the information needs of each can be met by either utilizing existing information resources or acquiring new resources;
9. prepare an information budget, allocate and control monies budgeted, and account for the utilization of such monies;
10. compare actual information performance against information plans; determine where expectations were not met; and make the necessary corrections in plans and operations; and
11. recycle existing information holdings to meet new projected uses, to avoid creating new holdings and flows where existing ones might satisfy needs.

#### Master of Science in Communication Technology

The Communication Technology program is closely related to the Information Resources Management master's degree program. The major difference between them is that a person in this program places primary emphasis on having an in-depth knowledge of the information technologies, including publishing, telecommunications, computers, video transmission and micrographics. Such

a person upon determining information needs would be able to design a system of information technologies that will best meet the economic and information needs of an organization or an individual. The program will have a strong component of systems design, cybernetics, and information theory. Perception and learning theory will also be included to enhance the student's awareness of human and training considerations in designing information systems.

The Communications Technologist must act as a bridge between increasingly costly, complex, and diversified information technologies on the one hand and increasingly larger numbers of managers and other users unfamiliar with the technologies, their applications, costs, and values. A major responsibility of the Communication Technologist is to serve as the principal advisor to top and middle management levels by providing technical expertise and counsel on such matters as planning an integrated information technology system, cost effective configurations of technologies, assessment of reliability and compatibility of various information technologies available for use, and assessment of the organization's total information technology needs.

#### Educational Requirements for Communication Technology

A Communication Technologist should complete an educational program in which the individual secures a general background knowledge of information services; an understanding of the conceptual and working characteristics of the various communication technologies (such as computers, telecommunications, micrographic equipment, audio and video systems, reprographic systems, and word processing); an understanding of the trade-offs between alternative systems or configurations or technology for information handling; an understanding of the economics of information; and an understanding of the ethics of information handling.

Communication technologists should have ability to work closely with people and assist in the selection, preparation, and training of staff who will operate the new technologies, as well as work with management. They should be able to anticipate problems and suggest methods for overcoming resistance to implementing systems of information technologies in organizations.

Graduates of the master's degree program in Communication Technology will be able to:

1. utilize the principles, concepts, methods, and techniques of communication technology to design integrated information technology systems;
2. assess the information technology needs of an organization;
3. plan, direct, and coordinate a complex information technology system for an organization;
4. assess the benefits and values of various information technologies in terms of specific organizational goals;



5. select, develop, and supervise subordinate technical staff;
6. establish and maintain effective working relationships with all levels of management and staff;
7. present clear and concise reports, plans, and ideas, either orally or in writing, and at the appropriate level for the intended audience;
8. prepare realistic equipment and operating budgets based on a knowledge of needs and financial constraints of an organization;
9. understand the long term goals of the organization and the relationship of various units in the organization in terms of the need for new and interrelated communication technologies;
10. assess operational performance of a system and make suggestions for improvements if the system is not operating at maximum effectiveness.

### Implications

While planning these new degree programs, we identified a number of implications for GSLIM, and we believe these are general implications for any school planning to meet educational needs for the information industry. Naturally, the implications all relate to the problem of scarce resources--people, money, and physical facilities. The implications are:

1. Each degree program will attract a different type of student, the mix of interest, skills, and values will be very different from that of most present-day library schools.
2. Each degree program will require a different type of faculty and again the mix of interest, skills, values and degrees will differ significantly from most present-day library school faculties.
3. Demand for graduates will increase and with expanded admissions to the program will come the need to expand faculties, support staff, and physical facilities.
4. Support staff will increase in number and also change in the type of skills and knowledge that will be required to perform the support services.
5. Curriculum planning will become more complex and coordination of course work, as well as cooperation between faculties, will be essential if costs are to be kept within reason.
6. Upgrading the knowledge and skills of existing faculty and staff will be an important and perhaps difficult task for the school.
7. The interdisciplinary nature and broad base of the information industry will require that the school be part of a university or have a very close working and geographical relationship with



a university. If that is not done, the cost of properly educating students will soar beyond reason.

8. The changes in information technology will mean a major investment in equipment if the programs are going to be more than "chalkboard" programs. Even if there is only a demonstration capability (with no student "hands on" experience) the cost will be very high.
9. Maintaining and upgrading equipment will become another major cost center for schools providing a broad based education in information transfer.
10. Due to the cost of the technologies, it is likely that closer working relationships ("partnerships with industry") will develop. Today, most library schools have only limited contact with business and industry. If programs such as those we have proposed are to work, it will be essential to develop close ties with all segments of the information industry.

The challenges are great and the cost will be high, but the benefits of meeting the challenges and costs of educating people for the information industry will be even greater, and I believe library schools are willing and able to meet the challenge and to reap the benefits.

F

Notes

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réseaux  
48e conférence générale de l'IFLA - Montréal  
22-28 août 1982  
Fédération internationale des associations  
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48th IFLA Session, Montreal, August 1982

Division of education and research

Section for library schools

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NETWORK OF LIBRARY SCHOOLS IN THE USSR IN  
DEVELOPED SOCIALIST SOCIETY (PROBLEMS OF COORDINATION,  
COOPERATION AND SCIENTIFIC/METHODOLOGICAL GUIDANCE)

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# NETWORK OF LIBRARY SCHOOLS IN THE USSR IN DEVELOPED SOCIALIST SOCIETY

(Problems of coordination, cooperation and scientific/  
methodological guidance)

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In the USSR much attention is paid to the development of education and the creation and elaboration of the network of higher and special secondary schools, which ensure the training of highly qualified specialists for all areas of economics, science, culture and art. An important place in this system is occupied by the network of higher and special secondary schools graduating specialists in librarianship and bibliography for research and special libraries and centralized library systems of public libraries. As of 1982, there are 29 higher and 131 secondary institutions which have library faculties (departments). The following table shows the distribution of library educational institutions among the Union republics.<sup>1)</sup>

| Republic            | Number of higher schools | Number of secondary schools |
|---------------------|--------------------------|-----------------------------|
| 1. RSFSR            | 12                       | 69                          |
| 2. Ukrainian SSR    | 3                        | 26                          |
| 3. Byelorussian SSR | 1                        | 1                           |
| 4. Uzbek SSR        | 1                        | 5                           |

1) This table is compiled after the book: Spravochnik dlya postupaushchikh v vysshiye uchebniye zavedeniya SSSR v 1981 g. M., 1981, 352 p. and Spravochnik dlya postupaushchikh v sredniye spetsialnye uchebniye zavedeniya SSSR v 1981 godu. M., 1981, 480 p.



|                    |   |    |
|--------------------|---|----|
| 5. Kazakh SSR      | 2 | 14 |
| 6. Georgian SSR    | 1 | 4  |
| 7. Azerbaidjan SSR | 1 | 1  |
| 8. Lithuanian SSR  | 1 | 3  |
| 9. Moldavian       | 1 | 1  |
| 10. Latvian SSR    | 1 | 1  |
| 11. Kirghiz SSR    | 1 | 2  |
| 12. Tadjik SSR     | 1 | 1  |
| 13. Armenian SSR   | 1 | 1  |
| 14. Turkmen SSR    | 1 | 1  |
| 15. Estonian SSR   | 1 | 1  |

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Total : 29 131

This network of library schools is being permanently expanded and improved, foremostly owing to the increase in the number of institutions graduating librarians-bibliographers of the highest qualification.

A notable feature of the Soviet system of library training is the State and social character of the activities of library faculties (departments) of higher and special secondary schools: equal opportunities in education are open to all working people irrespective of their origin social or property status, race or nationality, sex, language, attitude to religion, character of occupation and place of residence.

Training in library faculties (departments), as in all other higher and secondary schools in the USSR, is free.

Students receive scholarships and other material benefits.

The Soviet system of library and bibliographical training guarantees the unity of general academic learning and communist education, the connection of instruction with realistic life,

with the practice of communist development and activities of library and bibliographical agencies. This unity is directed towards all-round access to book riches, open to all working people. An important achievement of the Soviet educational system is realization of the unity of education, the continuity of educational institutions of all types, which ensures a smooth transition from the lower educational level to the highest. In the USSR special attention is paid to the coordination and cooperation of activities of educational institutions and the improvement of scientific and methodological management of the entire system of library and bibliographical education.

General administration of higher and special secondary education (including library and bibliographical training) in the country is realized by the USSR Ministry of Higher and Special Secondary Education. Its main objectives are: the development of a network of higher and special secondary institutions, which would guarantee the full satisfaction of the demand of national economy and culture of the country in specialists with a higher or special secondary education; scientific/methodological management of the training of specialists of the medium and higher levels, generalization and propaganda of advanced professional experience of higher and special secondary schools and the introduction of technical means and new methods of teaching. In full accordance with the current and prospective demand in specialists in different branches of economics and culture, the USSR Ministry of Higher and Special Secondary education develops and submits to the approval of the government a list of specialities the training in which is offered by higher and special secondary schools. It also, jointly with other interested ministries and

departments, works out and approves the curriculum, of higher and special secondary schools, establishes, by agreement with ministries and departments, which have higher and special secondary schools, a list of curriculum, which are approved by these ministries and departments. Thus currently all library faculties of higher educational institutions of the USSR organize educational and scientific/methodological work connected with discipline No 2113 "Library Science and Bibliography", the curricula of which was approved by the USSR Ministry of Higher and Special Secondary Education on June 9, 1976.<sup>1/</sup>

The curricula establishes the list of disciplines taught in library faculties the sequence of their study and forms of reports (by terms and courses); the order and number of hours of field and classroom practice; approximate number of disciplines, optional courses and special seminars; the detailed list of which is determined and approved by the councils of library faculties.

The curricula of discipline No 2113 "Library Science and Bibliography" is developed with the wide collaboration of library specialists and the faculty of institutions of higher learning. The approval of the curricula is preceded by discussions of its main points and of the list of disciplines and principles of specialization at meetings of the Library Council attached to the State Interdepartmental Library Committee of the USSR Ministry of Culture and at plenary sessions of scientific and methodologi-

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<sup>1/</sup> See: Ministerstvo vysshego i srednego spetsial'nogo obrazovaniya SSSR. Uchebny plan po spetsial'nosti 2113 "Bibliotekovedeniye i bibliografiya". M., 1976, 2 p.

cal councils and sections for library/bibliographical education, functioning within different ministries and departments.

The main document, on the basis of which the curricula is developed, is "Qualification characteristics of the librarian-bibliographer in discipline No 2113 "Library Science and Bibliography", approved by the USSR Ministry of Higher and Special Secondary Education on December 30, 1980. It establishes the professional nomination of specialists, who graduate from the library faculties of the day, evening and correspondence departments, and the qualification demands made of them by library and bibliographical agencies, and the theory and practice of librarianship and bibliography.

Qualification characteristics are also used in the prognostication and planning of the need in specialists; the substantiation of the composition of specialities and specializations, which ensure the training of specialists for libraries of all types; organization of the teaching process in institutions of higher learning; the placing of personnel, graduates of these institutions, and the analysis of the professional use made of them.

The USSR Ministry of Higher Education and Special Secondary Education also draws up programmatic methodological and instructive documents such as rules of admission to higher educational institutions regulations concerning the holding of course, periodical and final examinations and the defence of graduation theses, rules concerning in-house practice, etc. Thus, in keeping with the Rules of admission to higher educational institutions of the USSR for 1982, all those who want to join the library



faculty must take examinations in the following subjects: Russian language (or the language in which instruction is conducted), literature (oral and written); history of the USSR (oral) and one foreign language (oral).

The direct administration of educational and scientific/methodological activities of the library faculty of a higher educational institution is realized by the ministry to which the appropriate higher school belongs. In the USSR the majority of library faculties functions in the institutions within the jurisdiction of the USSR Ministry of Culture. Thus 17 institutes of culture and one art institute, belonging to the systems of the republican ministries of culture, have library faculties. Special departments of educational institutions, which are responsible for the planning of training of personnel, their placing and improvement of professional skills, the management of activities of higher and special secondary schools, which graduate specialists in librarianship and bibliography, ~~xxx~~ operate within the USSR Ministry of Culture and the appropriate republican ministries. The Department of educational institutions of the USSR Ministry of Culture approves curriculum of library faculties, organizes the preparation and publication of text-books, instructional aids and other academic and methodological materials dealing with special disciplines, holds seminars and meetings for faculty members, devoted to teaching and scientific and methodological activities of higher schools. This work is organized and monitored by the All-Union Methodological Laboratory for institutes of culture and art, which is attached to the Department of educational institutions.

The preparation of text-books and instructional aids is accomplished in accordance with long-term five-year plans, which are approved by the Department of educational institutions of the USSR Ministry of Culture. Thus, the long-term plan for the publication of text-books and instructional aids for 1981-1985 envisages the publication of 12 text-books and 5 instructional aids, intended for library faculties of institutes, and 3 text-~~books~~ books and 2 instructional aids for library departments of special secondary schools of this number the text-books "Bibliography. Basic course", "Bibliography of agricultural literature", "History of the technical book", "Work with readers" and the aid "Technical means of library work" were put out in 1981. In 1982 and 1983 the following text-books will be issued: "Bibliography of fiction and history of literature", "Bibliography of literature on art", "Bibliology and the history of printing". The instructional aids, to be published in this period, include "Information science and libraries", "History of foreign librarianship" and "Introduction to the library profession".

The overwhelming majority of these text-books appear in second and third editions and are obligatory for all library faculties and departments of educational institutions.

Centralized publication of curriculum for library and bibliographical disciplines is organized by the All-Union methodological laboratory for institutes of culture and art, which is guided in this endeavour by annual and long-term plans for the preparation and publication of curriculum, which are approved by the Department of educational institutions of the USSR Ministry of Culture. Thus only in the last three years over 20 curriculum in library science, bibliography, bibliology and history of prin-

ting were published, including such titles as "Work with readers" M., 1979; " Bibliology and history of printing" - M., 1979; "Bibliography. Basic course" - M., 1979; "History of librarianship of the USSR and foreign countries"-M., 1981; "Bibliography of technical literature" M., 1981; "Bibliography of agricultural literature" M., 1981, etc. As a rule, all curriculum of the various disciplines are reviewed and republished every five years.

Annually scientific and methodological conferences and seminars for the faculty, dealing with current problems of methodology of teaching of academic subjects, the reorganization of their content and the use of new technical means in the teaching process, are organized under the auspices of the Department of educational institutions of the USSR Ministry of Culture. Thus only in 1981-1982 scientific and methodological seminars for the faculty, dealing with the following course, were held: "Organization and management of librarianship", "Library science. Basic course", "Information science" and "Technical means of library work". For example, the seminars for members of the faculty, held in 1981, discussed current problems of improvement of such course as "Organization and management of librarianship" and "Library science. Basic course". As a result of these seminars the teaching of such subjects as the methodological activities of libraries, economics of librarianship, general theoretical questions of library science, improvement of methods of conducting laboratory and in-service lessons etc. appreciably improved. Currently new curriculum for the aforementioned courses, which will provide the basis for the revision and preparation of new text-books, are being developed.

Scientific and methodological conferences and seminars for

the faculty help to unite the efforts of prominent specialists in the field of librarianship and bibliography. They also focus their attention on the reorganization of the content of academic courses and teaching methods and encourage a wider use of the latest achievements and progressive professional experience of research and public libraries. On the basis of the recommendations of scientific/methodological seminars, collectives of authors of text-books and instructional aids in all specialized disciplines are made up.

The organization of periodical international conferences for the faculty of library schools of the socialist countries occupies an important place in the system of scientific/methodological arrangements of the USSR Ministry of Culture. These conferences were initiated by teachers of library faculties of Czechoslovakia, who organized the first conference on problems of higher library education in the socialist countries, in Prague. The second and third conferences were held in the German Democratic Republic (Berlin, 1962) and the USSR (Leningrad, 1968) respectively. The fourth conference will be held in Moscow in 1982. It will be devoted to current problems of development of higher library and bibliographical education in the socialist countries, methods of teaching improvement of the content of the major library and bibliographical disciplines, the organization of in-service training of students, etc.

The materials of these conferences are published as separate collections and represent an important factor of socialist consolidation and cooperation in the solution of general problems of training library/bibliographical personnel.<sup>1)</sup>

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1) See, for example, the book: III soveshchaniye po voprosam vysshego bibliotchnogo obrazovaniya v sotsialisticheskikh stranakh (Leningrad, 26-28 iunya 1968 g.). Materialy konferentsiyi. L., 1972. 157 p.



In order to draw the faculty of educational institutions into the development of prospective aspects of higher library/bibliographical education, the preparation of text-books and instructional aids and organization of methodological work and research connected with questions of training library personnel within ministries and departments, which are responsible for the administration of educational institutions, scientific/methodological councils (or sections) are organized. Thus, in accordance with the Decree of the USSR Ministry of Higher and Special Secondary Education (August 1979) the scientific and methodological council for library/bibliographical education was established. Its membership is made up of professors and teachers of library faculties of higher educational institutions of the RSFSR and other Union republics and leading specialists of the major libraries: the State Lenin Library, Saltykov-Shchedrin State Public Library in Leningrad, Library of the Moscow University and other libraries.

The Scientific and Methodological council on library/bibliographical education of the USSR Ministry of Higher Education is a consultative body, which promotes the development and organization of arrangements directed towards the raising of efficiency and quality of teaching in library faculties. Its main tasks are:

- development of recommendations directed towards the improvement of the content of instructional courses, the raising of the level of theoretical, practical and professional training of future specialists in librarianship and bibliography;
- scientific organization of the teaching process, introduction of new technique and new methods of learning;

- improvement of the provision of students with text-books, instructional aids and other methodological literature on library and bibliographical disciplines;

- raising the level of organization and control of the independent work of the students;

- preparation of materials, directed towards the advancement of raising of professional skills of the faculty.

The members of the Council also actively participate in the working out of draft of the curriculum of library faculties and qualification characteristics, and the preparation of scientific/methodological collections of articles dealing with the questions of teaching special disciplines and development of library training.

The Scientific and methodological council has already held two plenary sessions and a number of conferences of the presidium of the Council. Thus in May 1981 in Kuibyshev, the I plenary meeting of the Council discussed questions of further improvement of library personnel training in the light of the decisions of the Communist party and Soviet government on questions of ideological activity. the higher school and librarianship. The draft of the new curricula in discipline No 2113 "Library science and bibliography" was also examined. At the II plenary meeting of the Council (Baku, October 1981) problems connected with the current state and tasks of library faculties of institutes were discussed in all their aspects in the light of the 26 th Congress of the CPSU. The discussions were followed up by the approval of expansive recommendations of the Scientific and methodological council, directed towards the further expansion of the range of training of library and bibliographical

personnel, improvement of the teaching process in library faculties, specification of the directions of specialized library training and the approval of the draft of the new curricula, which has now been submitted for approval by the USSR Ministry of Higher and Special Secondary Education.

At meetings of the presidium of the Council which are held not less than four times within a year, current questions of improvement of library and bibliographical education and organization of methodological work and research in this field are discussed. Thus in 1980-1981 the following questions were discussed: specialization of students of library faculties, system of in-service ~~xxx~~ training of students, draft of qualification characteristics in discipline No 2113 "Library science and bibliography", the themes of scientific studies in the field of library science, bibliographical science, bibliology and informatics in the light of the decisions of the 26 th Congress of the CPSU, etc. Appropriate recommendations were also examined and approved.

The long-term plan of work of the Scientific and methodological council for 1981-1985 envisages the discussion and development of recommendations and suggestions on such current problems of library and bibliographical education as "Current state and ways of improving the independent work of students", "Problem lecture on special disciplines as a means of raising the effectiveness and quality of training of specialists in librarianship and bibliography", "Organization of research and educational/ research activities of students of library faculties and prospects of improvement of these activities", "Problems of the current state and prospects of development of library education in 1980-1990", "System of improvement of the professional skills of teachers

of special disciplines, its progress and prospects of development", etc.

Since the late 50 s, the Section of library and bibliographical education of the Scientific and methodological council of the RSFSR Ministry of Culture is operating on a regular basis. The membership of the Section includes the faculty and library employees of the Russian Federation, who join their efforts in the solution of current scientific and methodological problems of training library and bibliographical personnel and perspective problems of library and bibliographical education. They also work on the reorganization of the content of teaching separate special disciplines. Thus in recent years at the annual sessions of the Section of library and bibliographical education of the RSFSR Ministry of Culture such questions as the development of curriculum and preparation of text-books on disciplines covered by the new curriculum, approved in 1976, the training of specialists in the general aspects of librarianship and bibliography, improvement of the bibliographical training of students in the library faculties were discussed and appropriate recommendations were made. In 1982 the Section will examine problems of further development and improvement of teaching the discipline " Work with readers" and work out concrete measures connected with further work on the new curricula and text-book.

The activities of the Scientific and methodological council and Section on library and bibliographical education have promoted decision-making and realization of a number of important measures in the field of training of library and bibliographical personnel, the working out of perspective problems of library and bibliographical education and the solution of the problem of preparation



of text-books and instructional aids in all special disciplines. In recent years professors and teachers of library faculties of all higher schools of the Soviet Union take part in the activities of the Council and Section.

In this way, in the USSR the State system of scientific and methodological management of the network of library schools has not only been developed, it is being constantly improved. Measures in the field of coordination and cooperation of the activities of these schools, which favour the qualitative improvement of academic activities of library faculties, and the regulating and standardization of all activities in the field of library and educational training, are being successfully realized. The role of the Moscow State Institute of Culture, as of the All-Union research and methodological centre for library bibliographical education, is becoming more and more important. The final objective of all these activities is the graduation of highly qualified specialists in librarianship and bibliography, who are capable of solving problems connected with the improvement of the library service of the population and the education through libraries of harmonically and versatily developed Soviet people, the builders of a new, communist society.



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**networks**  
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INFORMATION PROVISION OF LARGE RESEARCH  
PROGRAMMES BY THE LIBRARY NETWORK OF THE USSR ACADEMY  
OF SCIENCE SIBERIAN BRANCH

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BRANCH.

Nowadays special purpose complex programmes represent the major form of organizing scientific research that corresponds to the process of integration in science. These programmes usually exceed activities of one scientific institution, department and sometimes of one country. The USSR Academy of Science Siberian Branch consists of more than 50 scientific institutions (SI) that carry out fundamental research in the most important fields of science and technology: Mathematics, Physics, Mechanics, Geology, Geophysics, Mining, Chemistry, Biology, Economics, History, Archaeology.

(Slide I. The Structure of the USSR Academy of Science  
Siberian Branch)

In research work of scientific institutions much attention is paid to special purpose and regional programmes the largest of which is a complex long-term programme of industrial power development of Siberia - The Siberia Programme.

200 academic and branch institutions, educational institutes and industrial enterprises take part in realization of the Siberia Programme.

A high level of scientific elaboration and search for effective forms of utilization of scientific results in production demands a well-organized system of information provision. The Information system of the USSR Academy of Science, Siberian Branch is built up as a centralized system:

- 1) The Central Library that functions as a regional information centre.
- 2) Central libraries of scientific centres in Irkutsk, Krasnoyarsk, Yakutsk etc.
- 3) Organs of scientific and technical information, patent and publishing subdivisions and libraries of scientific and research institutions.

(Slide 2. The Structure of the library and information system of the USSR Academy of Science Siberian Branch.)

The State Public Scientific and Technical Library (SPSTL) of the USSR Academy of Science Siberian Branch stands at the head of the centralized system.

(Slide 3. The Structure and main characteristics of the SPSTL network.)

Efficient information provision of special purpose and regional programmes is the main task of libraries and information services of the USSR Academy of Science Siberian Branch and first of all that of the SPSTL.

Carrying out this task demands:

- acquisition of the required literature and secondary sources of information, primary requests for



books and magazines corresponding to themes of elaboration of scientific - research programmes.

- improving the structure of information publications intended to reflect fully and authentically the state and ways of solving the problems included into scientific and research programmes.
- bringing to perfection organizing principles and technology of information provision of consumers.
- providing priority in information service to scientists and specialists carrying out tasks on implementing special purpose and complex programmes.

The SPSTL puts into practice centralized acquisition of libraries of scientific institutions in accordance with the main theme of research work of the scientific research institutions (SRI). Special purpose and complex programmes themes take a prominent place in Union specialized acquisition. In accordance with these themes books are acquired in plenitude and with the greatest possible efficiency. With relative stability in its main trends, the themes of literature acquisition on special purpose and complex programmes are dynamic, they are constantly improving in accordance with different stages of research, changes in separate aspects etc.

Priority principle is observed in providing SRI libraries playing the leading part in the elaboration of this or that scientific theme or programme with the required literature.

With centralized cataloguing carried out by the SPSTL for SRI libraries, books, magazines and other publications intended for institutions are marked with signature stamp "Molniya" ("Express") and are catalogued urgently.

They are presented at new entries exhibitions<sup>what</sup> is the most popular and effective form of information service. Exhibitions of new entries (books and magazines) are also organized in a centralized way. In the SPSTL exhibitions of new entries function at the new entries room and reflect all new entries acquired by Siberian branch of academic libraries. At the exhibitions of central libraries of scientific centres the literature on research theme of the given scientific centre is presented.

SRI libraries exhibitions of new entries represent new literature on scientific problems elaborated by the institution.

Information exhibitions of new foreign magazines have gained great popularity in Siberian Branch. The exhibitions are organized in SRI libraries where on the base of highly specialized book collection information on contiguous fields of science is provided

SRI libraries constantly propagandize literature on the themes of special and regional complex programmes, organize exhibitions during scientific conferences, symposia, workshops. Central libraries of scientific centres and the SPSTL organize exhibitions on contiguous subjects: problems of complex development of Siberia, development of the Baikal-Amur area, protection of national resources of Siberia etc. The SPSTL practices exhibitions within the city of Novosibirsk as well as in other towns of Siberia.

Scientific and practical conferences, Information Days, Specialist's Days are intended to promote realization of special purpose and regional complex programmes. The SPSTL carries them out in cooperation with the Central Scientific Technical Institution (CSTI), institutions of the USSR Academy of Science

Siberian Branch, institutes of higher education, industrial enterprises, party and public organizations. One of such complex arrangements was dedicated to powder metallurgy and included: Information Day with a large book exhibition, index literature, analytical review of foreign literature, scientific and practical conference, a series of lectures.

(Slide 4. Information service for scientists and specialists in the USSR Academy of Science, Siberian Branch).

The main base for establishing a system of information and bibliographical publications on special purpose and regional programmes is thorough and many-sided studying of information needs of scientists and specialists as compared with already existing information situation on each programme.

A detailed analysis of bibliographical provision of scientific and research programmes carried out by the SPSTI has proved that there is a lot of scientific and technical information practically on all themes published by all-union and branch information centres. Only on the programme "Development and utilisation of aerospace methods of studying natural resources and phenomena" alone there are more than 130 current and retrospective, signal, reference, analytical review publications without taking into account lists of literature (more than 300 entries) supplemented to books and articles.

But even with such an abundance of secondary sources it is required that alongside with all-union libraries scientific libraries, organs of scientific technical information of the USSR Academy of Science, Siberian Branch take part in establishing information and bibliographical materials it is caused by:

- a strongly marked complex and interbranch character of the majority of the programmes (while a centralized information system is built up mostly in accordance with the branch principle).
- a regional trend of resource and economic programmes (while a centralized information system does not fully envisage the regional aspect).
- a variety of requirements of different groups of consumers regarding contents, volume, kinds, forms, efficacy of information even on the same problem ( thus in research on the programme on aerospace methods of studying natural resources specialists of geological, geographical, biological, physical and mathematical institutions take part therefore they need absolutely different information in the frame of the same problem).
- a necessity of forming and national mutual use of factographic data bank stored by the information services and subdivisions<sup>of</sup> SRI in the process of research.

From this point of view it is advisable to issue current and retrospective bibliographic publications on regional problems: "Geology of Siberia and the Far East", "Oil and Gas of Eastern Siberia, "Climate and Hydrology", "Soils", "Vegetation", "Animals", "National Economy", "Protection of Nature of Siberia and the Far East", "Problems of the North", "Problems of the Baikal-Amour Main (BAM)" and others issued by the SPSTL. With prominent intensification of work of all-union organs of scientific and technical information in providing contiguous technical problems information services and libraries of the USSR Academy of



... after ...  
... including, ...  
... such as "vibration in mechanical", "Extraction  
exchange", "Application of mathematical methods in economics  
and sociology".

(Slide 5. Information and bibliographical provision  
of the SPSTL)

In the process of research on special purpose  
regional complex programmes themes and contents of  
and bibliographical publications of the SPSTL are  
ved. Thus at the beginning of the elaboration on "  
the middle region in connection with redistribution  
flow of Siberian rivers" a necessity of information  
of the new theme has arisen. While the volume of pub  
on this theme is not so large, information provision  
ried out under specialized headings in current bibli  
cal indices "Climate and Hydrology of Siberia and the  
"National Economy of Siberia and the Far East" and  
With an increase of information flow a new index ext  
icated to the problems of the Middle region will b  
lished.

Regional and special purpose programmes involve  
wide complex of liaisons and subdivisions: from sea  
porations to their realization in production. The pro  
of introduction of scientific results into national econ  
at all levels of the research at different stages of  
research different kinds, methods and means of inform  
foundations  
required. Establishment of methodological  
ation and bibliographical provision of scientific  
search programmes is an important task.

Consistency of information provision with different  
kinds of primary and secondary sources: documentation

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tical reviews, retrospective and current indices, abstract journals, patent and standard technical documentation, firm catalogs etc. is keeping in line with dynamics of information needs of scientists and specialists at all stages of their theoretical and experimental research, establishment of technical documentation in accordance with the results of scientific research work. Complicacy of the task is concluded in the fact that at different stages of realization of the programmes different kinds of specialists take part in it: from leading scientists to specialists in production. They need information of unequal degree of analysis and generalization, of various types and efficacy. It is very important from methodological point of view to carry out an optimal distribution of functions, competence and responsibility of information services providing information in accordance with scientific research programmes.

The SPSTL, central libraries of scientific centres of Siberia, information services and libraries of SRI exercise different functions in information provision of regional and special purpose programmes. The SPSTL carries out information provision of the programmes as a whole. It functions as an organizing body of the information system of the USSR Academy of Science, Siberian Branch, implements its theoretical, methodological and practical elaboration, coordinates network of all-union and central territorial organs of scientific and technical institutions and scientific libraries of the country and the area of Siberia and the Far East in the field of establishing information and bibliographic materials on the programmes.

Information and bibliographical provision of the complex programme of economic development of the Baikal-Amur (BAM) area may serve as an example of the above said. The system consists of the current index literature "The BAM Problem" that has been published since 1975, a retrospective index patent

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literature that include literature "from the latter half of the 19th century to 1975 (the index will be published in 1982) and the current patent literature "Building in specific conditions" established to promote introduction of up-to-date technique and technology into specific conditions of the area. Proceeding from the same requirements - information provision of the complex programmes "Ecology, protection of the natural surroundings", "Oil and gas of Siberia" and others. The State Public Scientific Technical library (SPSTL), of the USSR Academy of Science Siberian Branch builds up a system of current and retrospective publications in accordance with these programmes. Besides the SPSTL mostly functions as an establisher of information and bibliographical materials and as a rule keeps connections with scientists and specialists through the libraries of SRI. It is the libraries and information services of SRI whose duty is to provide scientists and specialists with the required information, in the required kind, volume, date in conformity with constantly changing stages of work. Scientific libraries and information services carry out these tasks in utilizing in plenitude all kinds of information materials and variety of forms of information service.

Within special purpose and regional programmes each library of SRI provides information on subjects 3, 5, 12 in practicing priority provision of their elaborators with information materials, documentations, copies of the originals. In the process of preparation of information on each theme librarians and information workers of SRI groups constantly look through from 4 to 12 bibliographical abstract journals, analytical review sources published by all-union, branch and department information centres. Conformable materials are efficiently distributed among scientists and specialists.

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the system of group and individual information, bibliographical bulletins and lists. Selective Dissemination of Information (SDI) and Differentiated Service of Managers<sup>(DSM)</sup> are successfully developed as progressive methods of information.

The principal from the general to the particular is laid into the base of development of the SDI and DSM systems of the USSR Academy of Science Siberian Branch. By means of the SDI and DSM systems the SPSTB serves scientists and managers of all institutions working at complex problems "Computerization of scientific experiments", "Structure and management of science". Information services and libraries of SRI use the SDI system in information provision of the elaboration on concrete themes of regional purpose programmes carried out by the institutions.

Integration of the activities of scientific and technical information organs and libraries taking part in information provision of special purpose and regional programmes, synchronization of their activities taking into account increasing of these kinds of work and decreasing of those ones depending on the stage of realization of this or that programme plays an important part in the information system of the USSR Academy of Science Siberian Branch.

At present in the system of the USSR Academy of Science there is a certain gap between up-to-day requirements to information provision of scientists and specialists and capabilities of libraries of SRI. It is well-known that modern forms of informing such as DSI and DSM systems publishing of analytic and prognostic materials require involving of highly trained scientists and specialists of corresponding branches of science and technique. So far in the majority of academic institutions organs of scientific tech-



nical information (STI) have not been established yet, and at those ones where they exist they work at the level of libraries applying the same forms and methods. It is necessary that information services work at a qualitatively higher level than libraries. Unfortunately information services of the USSR Academy of Science Siberian Branch have not their own methodological centre, that is why the SPSTL of the USSR Academy of Science, Siberian Branch has to function as such a centre as it is capable to render methodological assistance to scientific institutions to direct their information service in the right way.

Elaboration of scientific and research programmes carried out by Siberian Branch is a natural result of integration in scientific research: from homogeneous scientific collectives to complex interbranch and interdepartment co-operations. In this case a greater importance is paid not only to information provision of the programme as a whole but also to coordination of reliable and efficient information channels between separate bodies of this cooperation which are as a rule far away from each other territorially and differ in management. This can be regarded as a part of the problem.

One of the ways solving this task is establishment of a regional computerized information system of the USSR Academy of Science, Siberian Branch. The SPSTL of the USSR Academy of Science Siberian Branch has augmented working out a project of this system. On the base of the network data transfer being created at the Computing Centre of the USSR Academy of Science Siberian Branch a system uniting all scientific information data of the institutions of Siberian Branch will be established. Each component of

of this system also provides information to the

(Slide 6. Computerized System of Scientific Technical Information, the USSR Academy of Science, Siberian Branch).

The first phase of the computerized System of Scientific Technical Information, the USSR Academy of Science Siberian Branch uniting 10 institutions of Novosibirsk will be put into practice in 1985. At present scientists and specialists of these institutions are experimentally informed on problems of Biology, Chemistry, Physical and Chemical Biology and Biotechnology, Computing, Machinery, Protection of Nature.

The joining of the SPSTL and the institutions of the USSR Academy of Science Siberian Branch to the magnetic tape data distribution system of all union information centre that will be established in 1982 will promote information provision of scientists and specialists with secondary sources in plenitude.

Establishment of computerized magnetic tape catalogues and duplicating them into microfiches will prominently promote solution of the problem of creating regional union catalogues of books and scientific periodicals entries of academic (and later of other scientific libraries) of Siberia.

(Slide 7. The Computerized Service System of <sup>the</sup> Readers)

Computerization of information and library operations that has been augmented by the SPSTL and SRI of Siberian Branch will many times increase the volume of information service for scientists and specialists, will promote providing of full differentiated, efficient information of the elaboration of scientific research programmes

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Section on Library Schools and Other Training Aspects

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The Development of Networks  
in the  
English-Speaking World and Europe:  
the  
Contribution of the British Library  
Research and Development Department

by

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## A. INTRODUCTION

When searching for an adequate definition of "Networks" I began to develop a certain amount of sympathy for the school boy who, in desperation, defined a "net" as "a collection of holes tied together with string". In going to the Concise Oxford Dictionary, for instance, I was presented with the suggestion that a network is:

"arrangement with intersecting lines and interstices recalling those of net; complex system of railways, rivers, canals, etc; chain of inter-connected persons or operations or electrical conductors; group of broadcasting stations connected for simultaneous broadcast of same programme".

A Unesco report issued in 1976 (The Establishment of a Network for the Exchange of Technological Information) says:

"The objective of the technological information exchange network... is to enable the user to obtain the relevant technological information... regardless of the location of the information..." and "should be viewed as being composed of a large number of individual nodes and the links between them: the nodes could be both sources and users of technological information at the national, regional and international level... the links would consist of shared knowledge of the operations of all participants, compatibility among these operations, practical working arrangements and common aims".

Even these definitions did not help when surveying all the activities that I personally recognise as networks and networking. However, having gone through your excellent preliminary programme with the proverbial fine tooth-comb, I was reassured and the definition of networking as I now perceive it is: "The provision of communications between human and other resources to enable the most efficient use of library and information facilities."



I say "reassured" because I have always considered the library and information services of the United Kingdom to be an informal network which is itself composed of a variety of both formal and informal sub-networks and such a definition gives me a very wide remit indeed!

Even so, when we look at this definition, the librarian will almost certainly think first of local co-operative networks, the library automation buff will think of a computer-based system for requesting and providing bibliographic and textual records and the telephone engineer will think of a series of lines or optical fibres connecting various input and output devices.

In detailing the British Library Research and Development Department's contribution to the development of networks, I have had seriously to consider how best the different types of network can be described. I was, alas, originally trained as a taxonomic botanist and, not surprisingly, this made the task doubly difficult. However, what I have attempted to do is to typify the various forms of network and I suggest that any of these will have two or more of the following characteristics:

Methods used. They may be automated or depend upon manual or mechanical means.

Geographical coverage. They may be local, regional, national, multi-national or international.

Content. This may be specialised or non-specialised.

Type of service. They may provide catalogue entries, references for information retrieval, documents, information or intelligence.

In talking about forms, by the way, I have not tried to type the different physical shapes of networks since most of the ones I will be describing have some part of most possible shapes. Having identified some of the characteristics, I intend to isolate five specific types of library and information network that are available within the United Kingdom and explain where research supported by the R&D Department has contributed, or is contributing, towards their development. I would like also to take some tentative looks into the future. It must be stressed, however, that the classes of network I have described are not meant to be either comprehensive or individually exclusive. Indeed, such is the nature of networking that it would be impossible to have such classes.

#### B. LOCAL NETWORKS FOR LIBRARY CO-OPERATION

In many ways, this type of co-operation between public, educational and industrial libraries, forms the earliest example of a network, in the sense that this paper deals with the theme. Informal arrangements for local interlibrary loans must have been one of the earliest forms of library resource sharing and local co-operative library schemes started their formal life in 1933 with the formation of the Sheffield Interchange Organisation (SINTO). Since then many have been established, to a total of about 30 at present, rejoicing in such names as LADSIRLAC, ANSLIC, HERTIS and even, in the North East of England, NETWORK! The functions carried out by this type of network vary from area to area, from just inter-lending to co-operative acquisitions and coordinated information and reference facilities. The main base for the network varies, too, from the major local or regional public library service to local colleges of education.

In 1976 the then Library Advisory Council for England established a working party to study the adequacy of arrangements for library co-operation in the UK and rapidly came to the conclusion that systematic research was needed into the current pattern of co-operation and in 1977 the Research and Development Department commissioned a study with the following terms of reference:

To investigate, both by survey of the relevant literature and (where necessary) by visits, the present pattern of local and regional library co-operation within the UK, in terms of co-operative mechanisms for (a) inter-lending, (b) reference, (c) information provision and (d) processing (including mechanization). To provide for the Department of Education and Science and the British Library jointly, a report which identified the major co-operative activities, any gaps in provision and any research which may be needed to collect further information or to improve co-operative aspects.

The work was carried out by the retired Senior Library Advisor of the Department of Education and Science and a comprehensive report (1) was published in 1979. This report, incidentally, confirmed the difficulties of drawing rigid distinctions between activities of purely local or regional character and co-operation of a more general nature. I shall be dealing with the automation aspects of this report (ie the mechanized processing part) when discussing the next type of network. The report as a whole was used as the basis for a highly successful seminar on local library co-operation organised by the Research and Development Department in 1980 (2). The seminar performed a valuable function in disseminating knowledge about local co-operation and in acting as a forum for the exchange of experience but also, and more importantly from the point of view of the R&DD, in identifying areas for future research. Discussions firmly placed the local and regional networks in the context of the national network and hence produced implications for national planning. The reports of both the study and the seminar made very useful input into the discussions that resulted in the publication of "The Future Development of Libraries and Information Services", with which I shall deal later.

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After serious discussions of the suggestions for research made at the seminar, the R&D Department decided to concentrate the limited resources available for this field on studies of the measurement of benefits and costs of co-operation as compared with other methods of satisfying demand. A number of projects in this area are being examined at present and we are also looking at ways in which experience gained in local library networking can be transferred to other geographical areas.

### C. NETWORKS FOR LIBRARY AUTOMATION

One of the most significant factors for change that has confronted libraries over the past fifteen years is the application of computers to library processes. Early in this development the Office for Scientific and Technical Information (OSTI) - the precursor to the BL Research and Development Department - supported the then British National Bibliography Ltd (BNB) in examining problems of automating its records, a project which eventually led to the creation of the UK MARC files. These files now cover bibliographic records of British books and first issues of serials titles from 1950 to date. BNB Ltd later joined the British Library to form the Bibliographic Services Division; and the UK MARC files make up a large part of the BLAISE databases, which are central to a network of cataloguing and information retrieval facilities. We have also supported, in collaboration with the Inner London Education Authority, the experimental production of a catalogue of non-book material (with particular emphasis on audio visual materials used for teaching purposes) and this has been expanded into a machine-readable database covering material produced from 1960 onwards and known as AVMARC. AVMARC, too, is now one of the BLAISE databases. These two files, together with the LC MARC files, which are also available through BLAISE, form the major bibliographic databases accessible to a variety of users in the United Kingdom. By means of Information Retrieval Programs and a Library Software and an Editor Package individual users can select catalogue records on-line rather than create their own entries. Our research funds have thus contributed significantly to the evolution of a national network for library automation.



We have, however, also supported research aimed at solving the problems of local and regional networks. In 1969 we gave a grant (later extended to cover the period up to 1975) to establish the Birmingham Libraries Co-operation Mechanization Project (BLCMP) which originally involved the two University Libraries in Birmingham and the Birmingham Public Libraries. This was the first local network set up in the UK to explore the possibilities and potentials of a co-operative batch mode computer-based cataloguing service using both MARC records and records produced locally. The formal project report was received in 1976 (3) and the success of the work can be judged from the fact that in 1977 an independent company - BLCMP Library Services Ltd - was set up and now has approximately 30 members, no longer restricted to the Birmingham area (indeed, one member is in Italy!). The network now provides on-line services (known as BOSS) that provides ordering and catalogue support services.

From late 1969 to 1979 we supported four university libraries in the South West of the United Kingdom who had formed the South-West Academic Libraries Co-operative Automation Project (SWALCAP). Unlike BLCMP, this from the start was intended to develop on-line library housekeeping facilities and the first system to become operational was a shared on-line issue system which went live in September 1976. This offers on-line amendment and consultation of the loan file, trapping and loan recall generating facilities and flexibility in designating different categories of material, loan periods and user status. A separate loan file is maintained for each library and a single shared file holds brief bibliographic details for each item.

The first stage of the cataloguing system became operational in 1978. MARC records required by participating libraries are brought in from the British Library and BLCMP and stored in an Active Cataloguing File on the project's main frame computer. Amendments to the original MARC records and local processing are carried out on-line by a combination of the main frame and local mini-computers.

SWALCAP now has over 20 members and is still attracting new ones.

BL R&DD also supported (over the period 1976-79) some of the preliminary work that went into establishing the parameters for an on-line network for bibliographic processing in Scotland, which is geographically remote from London, and hence the BLAISE services. The grant was awarded to the Scottish Libraries Co-operative Project (SCOLCAP). As this development started much later than the previous two projects, the terms of reference were rather firmer and specifically requested that it should "integrate the Scottish network with any national network implemented by the British Library". The final report was issued in 1980 (4) and although there were several problems on the telecommunications side that had not then been resolved, the report stated that: "The signs are that SCOLCAP will develop into a sophisticated and flexible regional network, offering a wide range of connection options with the British Library system, and making the fullest use possible of the university regional network whose connection pattern so closely matches its own".

One of the largest automation co-operatives in the UK is the London and South Eastern Library Region (LASER) which, just to prove my point that it is difficult to produce an exclusive taxonomy for library and information networks, was originally set up to provide regional interlending facilities and therefore appears later under networks for document delivery. In 1974-5, with a grant from us, LASER undertook a survey of the literature on library automation and visited centres in the USA and Europe. The purpose of the study was to comment on the economic and practical feasibility of collaborative automation projects and to produce models for system development in libraries envisaging collaboration. This study resulted in the COLA report (5), which also set out preliminary proposals for the future development of automated library services at LASER. These proposals have now been implemented to provide the basis of a major on-line union catalogue.

In toto, then, BL R&DD-supported research has contributed greatly to the evolution of most of the major library automation networks in the United Kingdom. I should, perhaps, state here that in 1980 the British Library came together with all the library automation co-operatives I have mentioned and with other representatives of the library community, to form the Co-operative Automation Group (CAG). This Group has proved a valuable forum for discussion of common problems and for liaison with the British Library services.

A recent important development from CAG has been the emergence of proposals for a UK Library Database System (UKLDS) to provide for general access to a common database of cataloguing and location records including, in the first place, material from:

- (a) Library automation co-operatives (BLCMP, LASER, SCOLCAP, SWALCAP);
- (b) UK MARC and LC MARC;
- (c) British Library Lending Division monograph stock catalogue;
- (d) British Library Reference Division catalogues.

Other UK libraries will be encouraged to participate including, in particular, those libraries whose catalogues are created using the BLAISE-LOCAS service and those who currently contribute to union catalogues held at Lending Division.

If this exciting development goes ahead, then by 1984 the retrospective files available to UKLDS should cover over four million records with more than 400,000 new records being added annually. The national and local library automation networks will thus have access to one of the largest databases in the world - a potent indication of the value of collaboration between networks.

So far in this section I have talked about regional library automation networks that depend, at the very least, upon the power of mini-computers. Networks can also, of course, be local and can consist of a number of micro-computers linked together. In this field, the Department has recently made an award, jointly with the Department of Industry, to the Polytechnic of Central London to investigate the utility of a local area network for library automation, particularly for providing access to an on-line catalogue in a multi-site library. The facilities provided for the research will also be used as the basis for a demonstration centre for the intermediary and the ultimate user alike.

#### D. NETWORKS FOR DOCUMENT DELIVERY

The most important network for document delivery in the UK is obviously what approximates to a star-shaped network formed by the British Library Lending Division and its users. There are also, however, the regional networks formed by the Regional Library Systems, such as LASER, which I mentioned earlier. These Systems are voluntary associations created in the 1920s and 1930s mainly to assist inter-library lending through the use of union catalogues. Some have also developed special collections of material to form co-operative stock provision and they provide facilities for discussions of specialist topics within their regions. The interaction between these regional networks and the national network is often complex and the National Committee on Regional Library Co-operation brings together the interested parties.

Until relatively recently, most of the inter-library document delivery, whether in the form of originals or of photocopies, in the UK heavily depended upon the postal services. However, with increased postal charges, several Regional Library Systems started planning road transport schemes and in Yorkshire and

Leamington a road transport scheme for inter-library loans in the area and to and from the Lending Division proved to be very successful.



The British Library became increasingly concerned about the possibility of the Regional Library Systems establishing a variety of uncoordinated transport schemes, for the following reasons, as expressed at the time:

- (a) Doubts whether the schemes would make the most economic and effective use of resources.
- (b) Some schemes are selective in the types of libraries served, eg only those of public-library authorities. The schemes run or proposed by the Regional Library Systems serve member libraries only and non-members, particularly the smaller special libraries, have to rely exclusively on the postal service.
- (c) The effect these schemes would have on the operation of the Lending Division if the Regional Library Systems all wanted facilities for collection and return of items at Boston Spa, as in the Northern and Yorkshire and Humberside schemes. There are limits to the number of schemes the Lending Division can accommodate without lowering the standard of service to all its users. Each such scheme involves the Lending Division in additional sorting and administration.
- (d) The impact of differently priced and organised schemes on inter-lending between libraries, especially that between different regions. In 1976/77 22% of all loans involving the Regional Library Systems were made to libraries in other regions.
- (e) If a national Scheme proved to be practical and desirable, it might be difficult to implement it without costly or administratively difficult changes by individual schemes once they were established.

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In 1975, the R&D Department therefore commissioned the Local Government Operational Research Unit (LGORU) to study the feasibility of establishing a transport scheme for inter-lending in the UK. Their report (6) suggested that a substantial saving, then of the order of £300,000 a year, could be made. Following the report, the R&D Department funded two pilot studies - operated by LASER and the North Western Regional Library System - and set up an intensive monitoring exercise, after which another report was published (7). Both pilot schemes showed savings to the operators and the Lending Division and the exercise as a whole set parameters for inter-library transport schemes. The success of these research projects may be judged by the fact that LASER alone reckoned that its scheme saved over £100,000 in 1978/79.

We have also looked at other possible methods of document delivery, including the use of facsimile machines, but an early experiment in 1975/76 proved to be a failure because of the slowness of the machines used. However, with the increased efficiency of the machines now available, we have decided to re-examine the facsimile field and have commissioned a report on present and future prospects, which will soon be published.

#### E. NETWORKS FOR INFORMATION RETRIEVAL

I mentioned earlier the effect that the application of computers had on library processes. No less important is the effect that they have had on the processing of bibliographic references for information retrieval purposes. Some of the major British contributions to information retrieval networks (eg the production of INSPEC, the UK input to MEDLARS and Chemical Abstracts) have resulted in part from OSTI and BL R&DD supported research. At a fairly early stage in the development of on-line facilities - facilities which have led to the evolution of massive networks for information retrieval - we decided to launch a concerted programme of research into the handling of scientific and technical information by on-line techniques.

In 1973 we launched the so-called "short-term experimental information network" (STEIN) project with the following requirements:

- (a) Scientists, technologists and information workers in the UK should have an opportunity to use a range of on-line information retrieval services and their reactions to these services should be recorded and analysed.
- (b) The experimental users (and non-users) should be characterised, as far as possible, in relation to their present information-gathering habits, personal and organisational characteristics; and the needs of the user community.
- (c) The special feature of on-line systems, including speed of response, user feedback, and browsing ability, should be studied.
- (d) The role of a human intermediary to assist the user when using an on-line information service should be examined.
- (e) Users' response and adaptation to the constraints imposed by on-line information retrieval systems, a record of their errors, and the need for user manuals and other instructional aids should be ascertained.
- (f) A technical assessment of existing systems including hardware, software and telecommunication facilities should be undertaken.
- (g) The operating costs of the systems under experiment should be established.

This experimental network lasted until 1976 and the two reports (8) and (9) have provided useful planning data which was used, amongst other things, as a basis for the early creation of BLAISE. Perhaps just as important as the published results was the fact that the experience gained by both intermediaries and ultimate users in nearly 20 selected institutions helped build a body of expertise and knowledge that had previously been practically non-existent in the UK, particularly in the use of telecommunications networks such as Tymnet and Telenet.

We have since then introduced on-line searching experimentally in a large number of public libraries (10). Without this pioneering work, most of the participating libraries would not have gone on-line at all, or at best after some delay.

The BL Research & Development Department (and, before it, OSTI) has played a significant part on behalf of the UK in the planning and formation of EURONET - the European Communities network communications facility through which the Direct Information Access Network for Europe (DIANE) services are offered. DIANE now offers about 320 databases with about 10 new ones added each month. Our contribution here has not been so much in supporting research projects but in providing staff expertise to the Communities' Committee on Information and Documentation for Science and Technology (CIDST) and its various specialist working parties on both subject information and technology applications.

However, when EURONET was being planned, the Department realised the importance of potential UK hosts having experience or knowledge of the network's characteristics and in 1977 awarded a grant to a research group at University College, London to investigate the problems that UK hosts might face. Basically, the aims of the project were to:

- (a) build up practical experience with publicly available packet switched networks;
- (b) simulate EURONET behaviour to enable UK hosts to test out facilities in advance of the establishment of the network;
- (c) test standards to resolve ambiguities;
- (d) provide technical input for decision making by potential UK hosts;
- (e) advise potential UK hosts on the best way of connection and other problems concerned with the network.



The project produced an invaluable series of technical reports which are listed in the final report of the project (11) and helped expand the existing expertise at UCL but perhaps the strongest indicator of the value of the project is that the first two UK hosts were the first in Europe to connect with EURONET.

I would not like you, by the way, to think that all our support for information retrieval networking has been in the field of science and technology. We have also supported the UK station for experimentation into the Répertoire International de la Littérature de l'Art (RILA) network for input of items. The report on this project should be available soon but its main value to the Department is that it has, through experimental use of part of the database, enabled us to enter the still shadowy world of networking for humanities information.

#### F. NETWORKS FOR INFORMATION AND INTELLIGENCE

The networks so far mentioned are mainly dedicated to the efficient transfer of references, records, management information or documents; there are, of course, networks that transfer information and facts or, in an extreme case, intelligence (a form of specifically analysed information).

The referral function is one area where we have a strong but informal network in the UK and the BL R&D Department, in association with the Science Reference Library of the BL Reference Division, has recently established a working party to look at the possible need for an organised national referral system. We also contribute to the referral system by producing directories - for instance, "The Inventory of Abstracting and Indexing Services Produced in the UK" (12). We have supported several small projects on the form, content and coverage of published directories and will soon be holding a consultative meeting to discuss these projects and the recommendations made in their reports.

Libraries themselves, and the local library co-operatives, purvey information. One technology which has been made available comparatively recently in the UK is interactive videotex in the form of British Telecom's Prestel service. From the start of this service we were interested in it as providing a network for information provision both in the home and via such sites as public libraries and we have, in some cases in partnership with the Department of Industry and the Office of Arts and Libraries, supported several projects aimed at testing Prestel's effectiveness in carrying information. Several reports (13), (14), (15) and (16) are now available and we are considering how best to build on the experience so far accumulated.

As far as intelligence analysis is concerned, we have supported a fair amount of work on Information Analysis Centres. These Centres are frequently the focus of some of the so-called Invisible Colleges, which themselves form a network of research in particular fields of science and technology. An interesting programme of research which we are supporting at present is centred around the BLEND (Birmingham and Loughborough Electronic Network Development) which links an "Invisible College" of researchers in a specialist field (Human Factors in Computing) and enables them to experiment with several forms of communication ranging from mailbox facilities to an electronic journal that is refereed and edited on-line. Having established the facilities for the communication network, we intend to test it in other disciplinary communities.

#### G. "WORKING TOGETHER WITHIN A NATIONAL FRAMEWORK" AND RESEARCH

Earlier this year, the UK Office of Arts and Libraries published a document from its Minister's Library and Information Services Council (LISC - the successor to the Library Advisory Council (England)). This important document (17) consists of two reports, the second of which - "Working Together Within a National Framework" is highly relevant to consideration of future network development in the UK, particularly in that it stresses themes of co-operation and coordination and the effects of new technology on library and information services.

Many of the recommendations of this report are of relevance to the British Library and, in several cases, to the research effort supported by the BL R&D Department. We have, therefore, set up a mechanism to discuss these with the Office of Arts and Libraries. One of the most direct recommendations is number eight, which says that:

"The British Library should support research into the costs and benefits of co-operative arrangements as a logical extension of the work it already supports on co-operation."

As I have mentioned earlier, when discussing local library co-operation, we have already set this research in train.

A point worth bearing in mind in the context of networks is that the report lists "some criteria for determining the desirability of co-operative and coordinating arrangements". I would respectfully submit that these criteria could equally well be applied to the establishment of new networks. They are:

1. Does the scheme add to the effectiveness of the information services of the country as a whole?
2. Do the objectives of the scheme conflict with those of any other?
3. Does the scheme allow something, which is needed, to be done which previously was not done or was not done so well?
4. Will the scheme provide to as many users as high a standard of service as is already being given?
5. Will the scheme enable savings to be made whilst providing as good or better service than before? If not, is it cost effective?
6. Does the scheme have the financial, technological and staff resources to achieve its objectives in the most effective manner? In particular, does it take sufficient account of new technology?

7. Is the constitution of the scheme soundly based and so structured that it is capable of adaptation or improvement?

#### H. CONCLUSIONS AND FUTURE DEVELOPMENTS

In the paper I have attempted to show how centrally-supported research produces results that can contribute to the orderly growth of networks. From all our experience so far we have learned many lessons. There is a need to educate and involve the ultimate user; this we have done by demonstration projects and by including new techniques in our user education courses. There is a need to ensure that library and information science students learn about potentials of new technologies and networks in their current curricula; this we have done by encouraging and supporting research at library schools and by setting up a discussions group on new technology and library schools. For the practitioner and researcher, we have established our own network of information services providing the latest research results and experiences of good practice in areas of rapid change. Examples range from our Library Automation Information Officer, at Southampton University, to the On-Line Information Centre, based on the membership information organisation ASLIB, and once again funded jointly with the Department of Industry.

We have also learned that new technology applications are moving faster and faster and must be continually monitored, for their developments could radically alter the forms of networks that we see today. Amongst our many consultative groups, one of the most important is our New Technology Group, which is composed of experts from all areas of new technology and monitors and advises on research into new applications. It also advises the Office of Arts and Libraries on possible policy issues arising from new technology developments. Of a small project staff of 15 professionals, whose responsibilities range from information training in secondary schools, through information problems in all the disciplines, to basic research in linguistics, we now have 2½ full-time equivalents on new technology applications.



All this is necessary because of the change of pace. In one small area alone, for instance, - that of document delivery - within two years we have seen a rapid change in concept from the provision of the original or a photocopy to the provision of a facsimile, usually digitally transmitted through such projects as ARTEMIS, APOLLO and ADONIS. It is, surely, ironic that these concepts evolved from new technologies mainly in Northern Europe, but are named after ancient Southern Europe religious figures!

No-one can predict the future of networks and networking, except to say that it will be different from what it is and different from what one thinks it will be. Vast storage on optical discs, for instance, holds out the possibility of localised "stand alone" systems, whereas the evolution of expert systems holds out the possibility of interconnected computer networks with very little help for libraries and information officers. Whatever happens, I am convinced that we shall need more research and careful monitoring to ensure effective planning of the networks of the future.

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Section: Library Schools and Other  
Training Aspects

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Equivalence and Reciprocity of Qualifications:

A State-of-the-Art Report

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Meeting  
100.

"Equivalence and Reciprocity of Qualifications:"

A State-of-the-Art Report

by

Josephine Riss Fang and Paul Nauta

I. INTRODUCTION

The Section on Library Schools and Other Training Aspects had originated this project during the Brussels Congress in 1977 in response to the request for "Standards for Library Schools", which had been published in the IFLA Journal in 1976, so that an international reference source could be published which can be used towards greater professional mobility and international cooperation.

Thus, a Working Group was established in 1977 whose members also assumed responsibility as area coordinators to ensure world-wide coverage of the project.

1. The Objectives of the project were determined as follows:

- To collect data for determining criteria for the interpretation of professional qualifications world-wide;
- To provide a basis for comparison and international recognition of professional qualifications;
- To enable mobility of librarians and information specialists across national boundaries and thus facilitate professional exchange and cooperation;
- To prepare an international reference guide to professional education and training programs world-wide.



2. The Sequence was as follows:

a. Each area coordinator assumed responsibility for specific countries to ensure that all countries of the world would be covered.

b. A questionnaire was designed after much study and professional consultation. It was a difficult task, since the questionnaire had to satisfy a wide range of educational programs in one document without being too simple or too complicated. But the Working Group wanted to avoid different types of questionnaires and multiple mailings.

c. The translation of the questionnaire into French, Spanish and Russian was carried out by some of the area coordinators and with the help of specialists.

d. It is obvious that a project of such dimensions presents many problems and needs careful deliberations and discussions. For instance, the clarification of terminology and interpretation of educational systems. Therefore, the Working Group held numerous meetings during the regular IFLA Conferences and during and following the additional separate meetings of the Standing Committee of the Section. Furthermore, a great amount of written communication was necessary.

II. REGIONAL STATE-OF-THE-ART

The following is a brief summary of the results of the work of the area coordinators.

1. Africa

a. South Africa

As area coordinator for Asia and Australia, Edward R. Reid-Smith (P.O. Box 744, Wagga Wagga, N.S.W. 2650, Australia) offered to take care of South Africa. There were 14 schools identified. Complete information for 12 schools was received.

b. Arab Countries

For all Arab countries, both on the African continent and in the Middle East, Mr. Mohamed Benjelloun is area coordinator. Arab countries will be discussed under a separate heading later on.

c. For the remaining African countries, Mrs. F. Adetoun Ogunshye (University of Ibadan, Nigeria) is the area coordinator. She has experienced great difficulties in carrying out her assignment and has been unable to obtain the needed information, including a complete listing of library schools in her area. It is assumed that less than 20 library schools can be identified.

2. Arab Countries

Mr. Mohamed Benjelloun (School of Library Science, Chari Maa Al Ainaime, P.O. Box 762, Rabat Agdal, Morocco) is area coordinator for all Arab countries, both in Africa and Asia. A total of 16 library schools were identified. To date, full information on 6 library schools was obtained. Methods to get a higher rate of returns are being studied.

3. Asia, Australia and New Zealand

a. Mr. Edward R. Reid-Smith is coordinator for these areas, except China, Mongolia, and Western Asia. Approximately 110 library schools were identified, and slightly over 50 percent of the schools have provided information.

b. China

Josephine Riss Fang (Simmons College, Boston, Mass. 02115 U.S.A.) has taken responsibility as area coordinator for China. 18 library schools have been identified, including one in Taipei. Complete information was received from 12 and the rest are in the process of responding.

4. Socialist Countries

Mr. Konstantin I. Abramov (The State Institute of Culture, Moscow, USSR) is area coordinator for the U.S.S.R., and Mrs. Todora Topalova (c/o State Libraries Institute, Boul. Lenin 119, Sofia 1184, Bulgaria) has taken responsibility as area coordinator for the other socialist countries, including Cuba and Mongolia.

Mr. Abramov submitted summarized data on the activities of library educational institutions in the U.S.S.R. He is expected to also supply a listing of the individual institutions as required for the reference guide.

5. Europe

Mr. Paul Nauta (Frederik Muller Akademie, Keizersgracht 225, P.O. Box 10895, Amsterdam, Netherlands) is area coordinator for Europe as well as Turkey and Israel, exclusive of the socialist countries. He has identified some 110 library schools and received 80 replies.

6. Latin America

Mr. Adolfo Rodriguez (Universidad Nacional Autonoma de Mexico) had assumed responsibility as area coordinator for the Latin American region. The state of his progress is not very clear, since he has taken new professional responsibilities and did not supply the Working Group with a report. He had previously indicated that 50 to 55 library schools in his region were identified, and that some 20 percent had returned the questionnaire. The Standing Committee will explore whether Mr. Rodriguez will be able to devote his time to carry out the assignment.

7. United States of America and Canada

Mrs. Josephine Riss Fang is area coordinator for the North American continent. A total of 102 questionnaires were mailed to library schools, 70 of which are accredited library schools. 74 responses were received until now and more are expected. The statistics will slightly change due to the termination of some library school programs in the United States.

III. REFERENCE GUIDE

1. The Working Group made the following decisions:

- The reference guide will be in English and will be arranged in alphabetical order of countries.
- Each country will have brief introductory remarks on its general educational system. This information will be largely based on the International Guide to Education Systems (Paris: Unesco, 1979) and other current reference sources.



- Library education programs will be given in three levels:

| Level | Designation                                 | Minimum required total number of years of education at entry into LIS education | Duration of programs in LIS education |
|-------|---------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------|
| 1     | Post-secondary                              | 11 - 13 years                                                                   | 1 - 2 years                           |
| 2     | Tertiary (equivalence of university degree) | 12 - 14 years                                                                   | 3 - 4 years                           |
| 3     | Post-tertiary                               | 16 - 17 years                                                                   | 1 - 2 (master's)<br>3 - 5 (doctoral)  |

- In principle, library education programs below the post-secondary level are not included in the reference guide.

- Area coordinators prepare standardized profiles for each library education institution so that uniformity of terminology, entries, etc. are provided.

2. An example for a projected entry is herewith given:

MOROCCO

*Name:* "Ecole des Sciences de l'Information" (Information Science School)  
*Address:* Sharia Maa Alainain Campus University, Haut Agdal, Rabat  
*Tel.:* 749.04 *Telex:* -  
*Head:* Mohamed Benjelloun  
*Founded:* 1974  
*Administrative structure:* affiliated with the Government  
*Sources of Finance:* Government, Unesco  
*Programmes:*

1. "Informatiste" (post-secondary level)

*Entrance requirements:* foreign languages English, French  
*Duration:* 3 years  
*Scheduled hours:* theory 1980, practical work 182  
*Requirements for completion of Program:* final examination, dissertation  
*Name of (award, degree) diploma:* "Diplôme d'Informatiste"  
*Objectives:* various technical functions under professional supervision  
*Content:* - new technology: all types of media, computer application,  
data base utilization  
- research: -  
*Number of students enrolled in 1979/80:* 148 m, 73 f  
*Number of students completed the Program:* 37(1977), 26(1978), 36(1979) 29(1980)  
*Language of instruction:* French

2. "Informatiste Spécialisé" (tertiary level)

*Entrance requirements:* foreign languages English, French;  
practical experience 4 years  
*Duration:* 2 years  
*Scheduled hours:* theory 1605, practical work 107  
*Requirements for completion of Program:* final examination, dissertation,  
external examiners  
*Name of (award, degree) diploma:* "Diplôme d'Informatiste Spécialisé"  
*Objectives:* professional work in all areas of library and information  
science, including administrative and supervisory activities  
*Content:* - new technology; all types of media, computer application,  
data base utilization  
- research methods and research projects carried out by students  
*Number of students enrolled in 1979/80:* 20 m, 1 f  
*Number of students completed the Program:* 6(1977), 9(1978), 5(1979), 11(1980)  
*Language of instruction:* French

*Teaching Staff:* 1 administrator, 11 full-time, 23 part-time

*Degrees:* doctorate 1 full-time, 2 part-time  
master 9 full-time, 7 part-time  
bachelor 1 full-time, 14 part-time

*Percentage of time spent on:* teaching 33%, research activities 33%,  
professional activities 33%

*Publications:* 2 monographs, 4 refereed articles

*Physical Resources:* has its own library

*Collection:* 3005 books, 164 periodicals i.e. 164 current subscriptions,  
video-cassettes, microfiches, foreign languages tapes

*Access to library collections in the area*

*Access to non-bibliographic facilities (computer and reprographic equipment)*  
at the "Centre National de Documentation"

*Continuing Education:* -

*Professional Status:* Programs recognized by the Government; the equivalence  
of library education in Morocco and France is under consideration.

3. Other additional features of the reference guide are still under study. The projected publication date is 1983.

#### IV. FINAL REMARKS

A project of such dimension could only succeed so far with the cooperation of all our colleagues who kindly filled out the questionnaire. We would like to appeal to those who have not done so or who have not received a questionnaire, to contact the coordinator in their region, or any of the authors of this report. Only then, the reference guide will be truly representative of professional education.

The Working Group considers this project a first step towards providing data for establishing educational professional criteria and hopes that the reference guide will find great use for evaluating educational professional programs world-wide.

Boston, August 20, 1982